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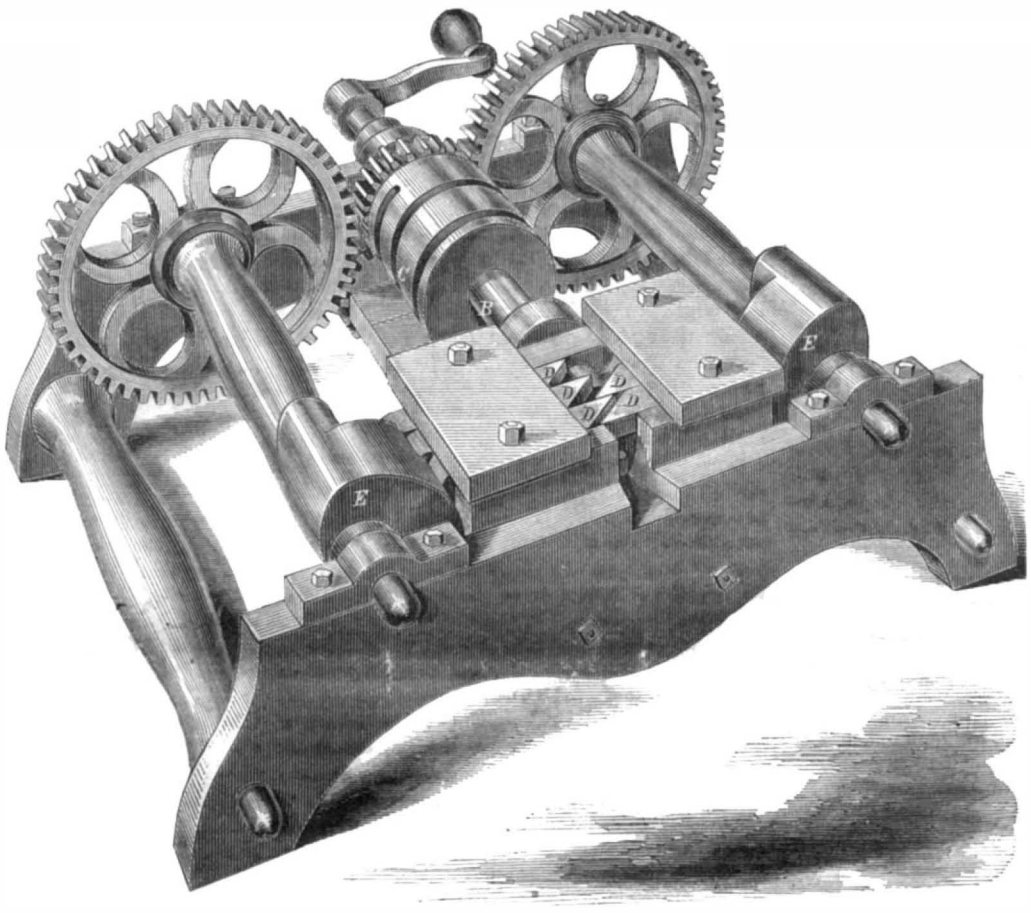
Machine for Twisting Augers.

The manufacture of augers, like some other articles of common use, seems to have escaped the grasp of inventors until the present time; prolific as they have been in supplying every imaginable want in many other things, and even in making articles for which a demand has to be created. The want of a good practical machine for twisting augers, has long been felt in the trade, and several attempts have been made to supply it, from time to time, although hitherto more ingenuity than practicability has been shown by those who have had the matter in hand. More success has attended the efforts to improve the form of the auger itself.

The improvement is very marked between the old shell or pod auger—which has to be drawn and greased every few inches while in use, and required all the strength of the workman to force it into its work—and the modern ship auger, turning out the chips with an ease and rapidity little dreamed of by our forefathers. The blank, A, Fig 3, is forged by hand or swedged in a "drop," and has a longitudinal rib, or feather, running along its center, to insure the requisite stiffness and strength. The point end of the auger is inserted in a transverse slot—not shown—in the shaft, B, to the depth of the flat portion which is to be twisted, the shank end being held by a pair of tongs.



GRIER & BOYD'S MACHINE FOR TWISTING AUGERS.

The shaft, B, is provided with a cylinder, C, having a screw, or spiral groove, cut upon its surface, with a gaining twist. A pin secured to the frame under the cam works in the grooves, serving as a nut. The shaft, being rotated by the crank or a pulley, is drawn back as it turns by means of the screw cam. When half a turn is made the first of the jaws, D D, are forced together by means of the cams, E. The first pair of jaws seize the auger, and, being the exact negative of its twist, hold it firmly and prevent further twisting. The next pair come to their work on the next half turn, and so on until all the jaws have performed their office, when springs under the jaws force them simultaneously apart as the cams rotate past their centers. It will be seen, by reference to Fig. 2, that the faces of the jaws are dies, exactly corresponding to the twist of the auger. The complete operation, from the time the blank is entered until the auger is completed, occupies only ten seconds.

By trials with a wooden model, using blanks of cast lead, we are satisfied that the machine will do all that is claimed for it. Undoubtedly it may be somewhat modified, but the principle and execution are excellent. It certainly is a decided improvement on the present process.

The best points in this machine will soonest be perceived by the practical auger maker. From the manner in which the blank is fed out no undue strain can draw the edges. The lips are set quite true while being twisted further, so that on leaving the machine no "crimping" is required, and the surface is so smooth that it can be at once put on the emery wheel.

Fig. 2

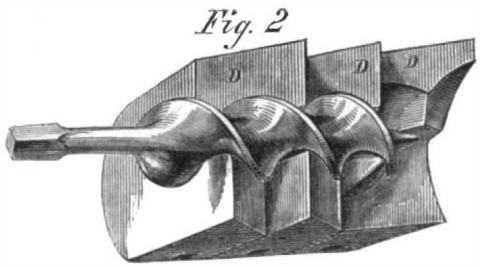
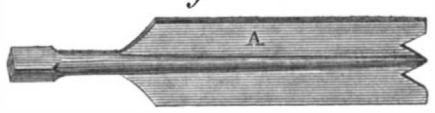


Fig. 3



Patented May 22, 1866, by Messrs. Grier & Boyd, Hulton, Alleghany Co., Pa.

Nitro-glycerin.

The Academy of Sciences has received a paper from M. Ropp on the application of this highly explosive substance to blasting the sandstone quarries of the Vosges. The catastrophes at Aspinwall and San Francisco having proved how dangerous it is to convey this substance from place to place, M. Ropp has his nitro-glycerin manufactured on the spot. For this purpose smoking nitric acid is mixed in a sandstone trough, standing in cold water, with double its weight of concentrated sulphuric acid, while at the same time a quantity of glycerin, exempt from either lime or lead, is evaporated in a caldron to the consistency of sirup, making from 30 deg. to 31 deg. of Beaumé's areometer. When this glycerin is perfectly cool, 500 gms. of it are slowly poured into a glass balloon immersed in cold water, and containing 3,300 gms. of the mixture of acids, which must also be cold. While this is doing the liquid must be well stirred. It is then left to stand for ten minutes, after which it is poured into about six times its bulk of cold water, which is made to turn round all the time. The nitro-glycerin is immediately precipitated in the shape of a heavy oil, which is separated by decantation, and then bottled. To use it for blasting, a hole is drilled into the rock, and 1.500 gms. to 2,000 gms. of nitro-glycerin are poured in. A cylinder made of tin or pasteboard, about one and a-half inches in diameter, and two inches in hight, and filled with gunpowder, is gently let into the hole, till the operator feels that it touches the liquid. A slow match is affixed to this cartridge, and the hole is filled up with white sand, the match is lighted, and in about ten minutes the gunpowder will catch fire, and give the nitro-glycerin the necessary shock to make it explode. The whole mass of rock is then seen to shake, waver, and then settle down again. No piece is projected to a distance, and it is only on examining the spot that it is possible to form an idea of the immense force developed. Formidable masses are found slightly displaced, and rent in every direction. In this way from 40 to 80 cubic meters of hard rock may be detached at a time. Nitro-glycerin, when long exposed to moderate cold, will crystallize in needles. In its liquid state it is a yellow or brownish oil, heavier than water, and insoluble in it. It does not easily catch fire, nor does it explode without a smart shock, except when by long keeping it gets decomposed. Its taste is sweet and aromatic; it is poisonous, and a very small quantity will cause violent headache.—*London Mining Journal.*

The "Bellerophon."

On Aug. 17, a series of trials of the fine iron-clad *Bellerophon* took place at Stokes Bay, when results were obtained which demonstrated in the most striking manner the soundness of the principle upon which the vessel had been designed. On the occasion in question the ship's draught was 21 feet 7 inches forward, and 26 feet 6 inches aft, her displacement being about 7,230 tuns, and she was fitted with a

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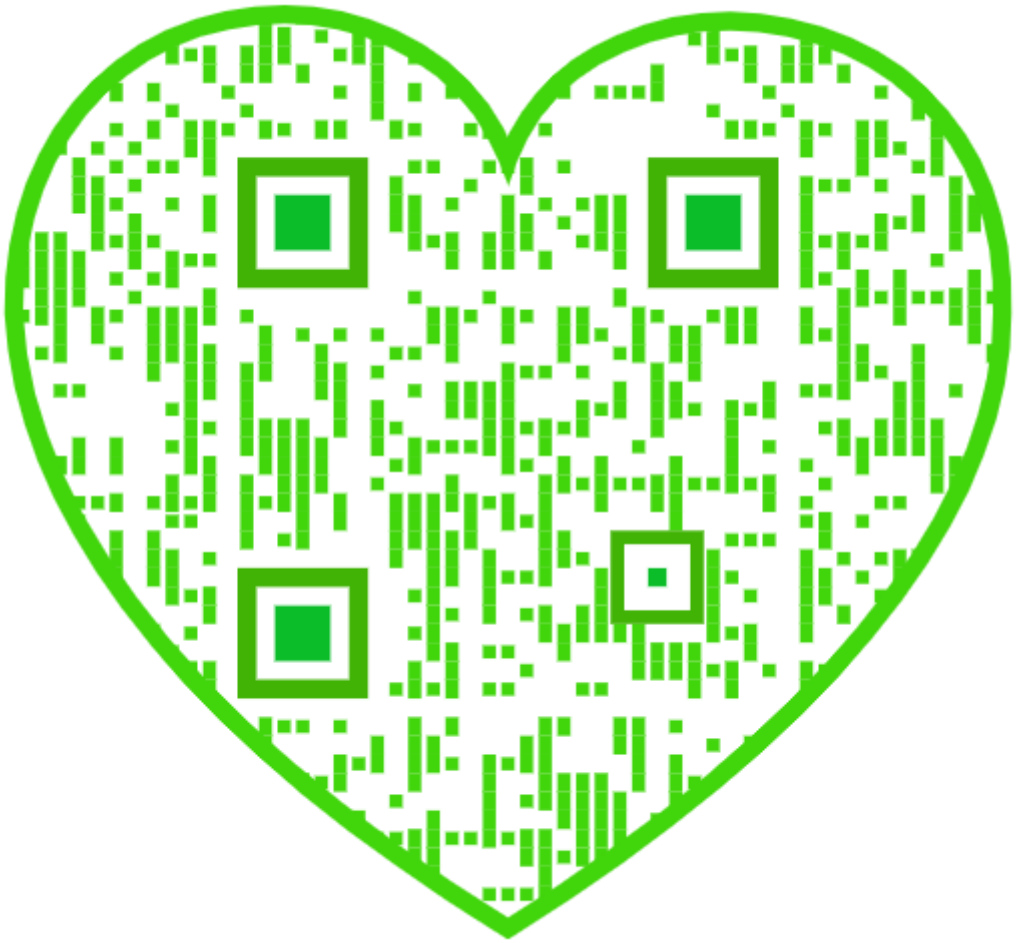

Griffith's screw, 23 feet 6 inches in diameter, with a pitch of 20 feet. The wind was very strong at the time of the trials, but, notwithstanding this, the mean speed obtained during six runs over the measured mile, made with full boiler power, was 14·201 knots, the engines averaging 75 revolutions per minute, with a pressure of steam of from 27 to 28 lbs., and a vacuum of 25 inches. The indicated horse-power developed by the engines was 6,400 horses, or nearly 6½ times the nominal power, and the whole of the machinery which, as is well known, was constructed by Messrs. Penn, worked in the most free and perfect manner throughout. After the handiness of the vessel had been tested, and proved by turning circles, four runs were made with half-boiler power, the result being that a mean speed was obtained of 12·164 knots, the engines averaging 63 revolutions, while the pressure of steam varied from 22 to 26 lbs., and the vacuum from 25½ to 26 inches. The turning power of the vessel was then tested under half-boiler power, and the trials concluded with some experiments on the working of the engines to signal from the bridge telegraph. In these latter trials the engines were stopped from full speed ahead in 30 seconds, started astern in six seconds, and changed from full speed astern to full speed ahead in 19 seconds. As is well known, the *Bellerophon* was built according to the design of Mr. E. J. Reed, who has asserted that the great length of the vessels of the *Warrior* class was not essential to speed in an iron-clad frigate ; but that the necessary speed could be obtained in combination with moderate size and cost, and with the additional advantage of increased handiness. The trials of which we have above given some particulars completely prove the soundness of these assertions, the *Bellerophon*, a vessel 300 feet in length, attaining a speed which was only 0·155 of a knot less than that of the famous *Warrior*, a vessel 380 feet long, while it exceeded that of the *Black Prince*, a vessel of the same dimensions as the *Warrior*, by more than half a knot. We congratulate Mr. Reed upon his success, which is a most gratifying one.—*Engineering.*

The Art of Dining.

The following sensible advice in the art of dining is from the pen of Prof. Blot, whose work on the art of cookery we have so often had occasion to refer to in these columns :—

"The mind has its diseases as well as the body, and I think vegetarianism is one of them. It is by practical experience that we learn what food is proper for us, and not by chemical analysis. Every thing we eat, with the exception of salt, can be turned into charcoal ; yet who can live on charcoal ? An experiment has been made by the great chemist, Magendie. He fed geese on gum only and they died on the 16th day ; he fed some upon starch only, and they died the 24th day ; he fed others on boiled white of eggs, and they died on the 46th day ; he fed others on the three kinds mixed together and they fattened instead of dying. So we must vary our food as much as possible in order to supply the waste of every part of our system. In cooking vegetables, green vegetables, such as cabbage, spinach, etc., should be put into water at its first boiling, with salt. Dry vegetables, like beans, peas, etc., should be put over the fire in cold, soft water, after having been soaked in luke-warm water—beans for twenty-four hours. Potatoes should be steamed but never boiled Steam with the skin on. Bear in mind that a potato must never be pealed ; the part immediately under the skin contains the most nutriment. Cut out the eyes or germs if any ; if young and tender, the skin can be taken off with a scrubbing brush ; if old, scrape the skin off and then roast them. In selecting the potato, remember the smaller the eye the better the potato. By cutting a piece from the thickest end, you can tell whether they are sound. They must be either white or pink, according to the kind. Always select beans without spots. Milk and eggs partake of the nature of animal as well as vegetable food. Fish is less nutricious than meat, containing only 20 per cent of nutricious matter, but ought to be partook of at least twice a week. It contains more phosphorous matter than any other food, and is very good to supply the waste of our system, especially of the brain. The brain of an idiot contains about one per cent of phosphoric matter, while that of persons of sound intellect contains from two to two and a half per cent. The brain of a maniac contains three and a half per cent. We need not fear, however, of losing our senses from eating too much fish. It supplies the waste, but does not augment the proportion of the phosphoric matter."

The chemistry of the matter might, perhaps, be stated with more precision. For instance, instead of saying that everything we eat may be turned into charcoal, it would be more accurate to say that carbon, being the one solid of the four organic elements, the others may be driven off by heat, leaving the carbon behind in the form of charcoal.

Items from the British Association.

At the recent meeting of the British Association at Nottingham, a paper was read in the mathematical section, by A. Claudet, F. R. S., on a subject which will prove of great importance to all interested in photography, "on a new process for equalizing the definition of all the planes of a solid figure represented in a photographic picture." The impossibility of procuring a well-defined image of all the various parts situated on different planes, has always been a serious disadvantage in taking large pictures. If the instrument is focussed for one plane of the face, such as the cheek, minute granulations of the surface are sharply defined, while another plane, as the nose or ear, is so far from the focus as to have an indeterminate outline. M. Claudet sought to obviate this evil by changing the focus while the plate is being exposed. To effect this the lens tube was arranged with rack and pinion, so that the back lens might be moved during exposure over a distance not exceeding one-twentieth of an inch, by which operation a succession of images of each plane is portrayed.

After reading the above article, which elicited much applause, M. Claudet exhibited and explained a variable diaphragm of great ingenuity and simplicity, which he designed for use in telescopes and photographic lenses. The diaphragm is simply an india-rubber cylinder composed of a series of ribbons or strips placed longitudinally. When now the cylinder is twisted round by one end—the other remaining stationary—it will acquire a sand-glass form, the center gradually closing to any diameter required. A diaphragm having this property was patented in the United States some years ago.

In the chemical section of the association, we have the description of a "new magnesium light," invented by H. Larkin, the distinguishing peculiarity of which is, that magnesium is burned in the form of powder instead of ribbons or wire, and consequently the action is not dependent on clock-work or other motive power.

The metallic powder is placed in a receiver, whence it escapes through an orifice into a brass tube, which has also a stream of common illuminating gas introduced at its upper end. The united gas and metal flow together down the tube and are ignited at its mouth, producing a light of great intensity. In order to insure the steady flow of the powder from the reservoir, fine sand is introduced in any quantity depending on the brilliancy of the light required. A valve also regulates the flow of the powder, or entirely shuts it off, leaving the light from the illuminating gas alone.

In answer to inquiries, Mr. Larkin stated the expense of the light would be about $5 per hour, but that further reductions in the price of magnesium were anticipated.

Improvements in the Construction of Artesian Wells.

The sinking of artesian wells cannot be claimed as an invention. This method of obtaining a copious supply of water dates back many hundreds of years, and is even claimed by the Chinese to have been introduced by them centuries before the Christian era.

Improved machinery has greatly facilitated the boring of artesian wells in this country, and the latest improvements are now being used in the sinking of the artesian well at Detroit, Mich.

Instead of the old samson post and walking-beam, the new boring apparatus works upon the independent drop principle, and can be let down and changed instantly from three inches to as many feet. This is done by means of a new frictionless cam working upon leathers attached to the drop-chain. The auger which is used to bore down as far as the rock is a semi-cylindrical tube of iron two and a-half feet in length, ten inches in diameter, pointed with steel, and bottomed to hold the clay. It is worked by a windlass, instead of the original temper screw, which was slow and tedious. The auger stem is two and a-half inches diameter, best wrought iron, constructed in sections of sixty feet.

The machinery appliances are of such perfection that instead of the ten to sixteen horse-power required at the common machine, three or four will suffice. The well will be lined with the strongest boiler iron in sections of twenty-five feet in length. The largest of these will be eight inches inside diameter, and as the well is sunk, smaller sections will be slid down through and joined, so that from the top to the bottom it will be a single case of solid iron.

Armor-plate Fastenings.

As Mr. Holley remarks in his work on ordnance and armor with respect to armor plates :—"After all it is not so much a question of plates as of bolts" (par. 192); "and, if one plate is thrown off, the ship is at the mercy of 15-inch shells." The Admiralty are, very properly, just now doing their utmost to determine upon the best fastenings for armor plates. Upon an admirable principle, in the abstract, is Major Palliser's plan, which simply consists in turning down the shank of the through bolt to the smallest diameter of the screw thread. This principle has been adopted in many cases from time immemorial by engineers. A neat adaptation of it is given in Mr. D. K. Clark's "Recent Practice on the Locomotive Engine," who (p. 17) recommended, long before Palliser's patent, the thinning down in the middle of firebox stay bolts, in imitation of a similar arrangement adopted several years previous in America. This in itself would not diminish Major Palliser's merit, nor invalidate his patent, for the application of this perfectly sound and very ingenious idea to armor-plate bolts. But, no doubt unknown to Major Palliser, Messrs. Brown & Co., of the Atlas Works, as has been stated to us on unimpeachable authority, made their armor-plate bolts on this plan before the date of the gallant officer's patent ; and they found themselves obliged to reject it because such bolts, thinned out in the middle, could not properly fill up the hole in the backing. We believe, however, that Major Palliser increases the size of his bolts for re-insertion by coating them with an alloy of lead and antimony. Whether this addition will give fair play to the principle, remains, we suppose, to be tested. It is very proper that the Admiralty and the War office should fairly test meritorious plans of this kind ; and the inexorable logic of 68-pounders soon sifts, as it has so often done before at Shoeburyness, the wheat from the chaff.—*Engineer.*

Austrian Manufactures Injured by the War.

We regret to announce, says the *Memorial Diplomatique*, that the participation of Austria in the Universal Exhibition to be held at Paris next year has become very doubtful. The most busy manufacturing provinces of the empire are Bohemia and Moravia, which have been literally ravaged by the Prussian occupation. A large number of objects intended for the Exhibition at Paris have been carried off by the Prussians; and again, the exactions and the contributions of all kinds that were levied have been such as to place it beyond the power of the manufacturers to make those fresh sacrifices which would be required to maintain their credit in the general competition of 1867. Rather than present themselves in a position of lamentable inferiority, the Austrian manufacturers prefer to abstain from appearing at the Paris Exhibition, and to reserve their powers for the great Exhibition which is projected to be held in Vienna in 1870.

THE office of the "Nautical Almanac" is to be removed from Cambridge to Washington. The superintendence of the Almanac has been placed in the charge of Professor J. H. C. Coffin.

A PIANOFORTE has been constructed in Paris, having the strings replaced by tuning forks. The new instrument has great power and sweetness.

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[For the Scientific American.]

INTERESTING AGOUSTIC PHENOMENON.

CAUSE OF THE JINGLE OF CERTAIN NOTES ON THE PIANOFORTE AND OTHER MUSICAL INSTRUMENTS.—Many persons have been annoyed by the unpleasant jingling sound of certain notes on a pianoforte, and without the remotest conjecture as to the real cause, have searched the instrument through for some screw loose or some substance supposed to have accidentally fallen in among the works. They have undoubtedly noticed that it was not always the same note that jingled, and that sometimes unaccountably the jingle would cease for a while and then suddenly be renewed, and also that changing the position of the instrument in the room would stop the jingle or transfer it to another note. About two years since I consulted Mr. Wilde, a pianoforte maker and tuner, of this city, about certain defective notes on my piano, one of which it seemed almost impossible to tune correctly. Mr. Wilde informed me that he had frequently noticed, even on the best pianos, that therewas very frequently one such note which it was impossible to bring to a good unison (that is of its two strings), and, moreover, he said that it was not the fault of the piano but something in the room that interfered, and that the jingling of certain notes was not in the piano but outside of it. He had lately had a new and first-rate instrument condemned because of the intolerable jingle of two of its notes, and requested me to go with him to see this piano and verify his theory. We accordingly visited the house where the pianoforte had just been set up, and found the complaint justified by the fact that two of the strings had a very loud jingle. The room was very small, and while I continued to strike one of these notes, Mr. W. went about the room touching everything with his finger, and at last he touched a pane of glass in the window near the piano and the jingling ceased at once. On removing his finger it recommenced. On applying the finger nail very delicately to the pane it was found to vibrate, and on approaching the ear it was heard distinctly to give out the precise sound of the note on the piano. The solution of the jingle was now clear. The pane of glass was loose and its key note was in exact unison with the much-abused note of the piano, and whenever this note was struck the glass was sounded according to the sympathetic law of acoustic vibrations, and the real jingle was from the pane of glass and not from the string. On wedging the pane so as to prevent its vibration, the note on the piano was as smooth as could be desired. Search was then made for the confederate of the other jingling note, and this, too, was found to proceed from another loose pane of glass in another window. This being wedged up the piano was found to be in excellent order. The theory of Mr. Wilde as to the sympathetic vibrations being thus fully verified, not the least curious feature of the phenomenon remains to be explained. How does it happen that the jingle all seems to come from the piano and is not referred by the ear at once to its true source? This depends upon that remarkable defect of the ear, viz., its inability to judge of the direction and origin of sounds, especially when all the attendant circumstances are favorable to an illusion. It is the identical principle upon which the ventriloquist depends for the success of his art. The string is struck, gives out its sound, and before it ceases, the sympathizing pane of glass or other body commences to sound and continues its sound after the original note has ceased. This prolonged sound is not located by the ear any further than to identify it with its actual origin, the piano, and hence the illusion. The eye, the ear, the fingers, all bear testimony to a note from the piano, the judgment is so informed, and the ear, unassisted by either of these witnesses, is incapable of truly locating the sympathetic sound, or, at least, is the unsuspecting dupe of the other senses, and the two notes being blended are referred to one origin. There are some very curious freaks observed about these sounds. Sometimes the motion of the piano alone will stop them or transfer them to other notes. It is probable that absolute unison is necessary to produce the sympathetic sounds to any notable degree, and that the motion of the instrument upon the floor produces a change of tension, either on or in something without the instrument so as to effect the result. A most remarkable instance of this jingle lately came under my observation here. A new piano at a friend's house was found to have a jingling note, and the whole parlor was searched for the cause. At last it was found in a mantel clock. The striking part of the clock had run down and upon winding it up the jingle ceased. Anything loose about an instrument will annoy by its rattling, but it will be found generally that the jingling of certain notes can be traced to sympathetic vibrations and be readily cured.

CHAS. G. PAGE.

Washington, D. C., Sept., 1866.

Reproduction of Drawings, Etc.

A process has recently been patented in England for the direct reproduction of drawings, tracings, or engravings, whereby a *fac-simile* copy is procured, the light and shade of the original being copied as such, and not reversed as in the ordinary method. The paper designed to receive the copy is floated upon a solution consisting of thirty grains bichromate of ammonia dissolved in one ounce of water; to this is added an amount of dilute phosphoric acid, to be determined by trial, generally about two drams. The paper thus prepared is dried in the dark, and may be kept any length of time. When used, it is placed in the ordinary printing frame and exposed from two to thirty minutes, depending on the light. When removed from the frame, the paper, in contact with the drawing, is laid on the bottom of a box and exposed to the vapor from a dilute solution of aniline in benzole, which blackens all the parts not previously acted upon by the light; washed in pure water, rewashed in dilute sulphuric acid, and again in water; after which the print is fixed with a solution of thirty grains phosphate of copper in one ounce of water; to this add sulphuric acid till a clear liquid is obtained, and fifteen drams of a saturated solution of chromic acid.

An Invention Wanted.

An eminent reporter for the press, etc., says:—"Will you allow me to inquire through your paper whether it is not possible to prepare thin tissue paper chemically in such a manner that by moistening it and using a hand press, it will take the impression, and produce a copy of any written document, no matter how long the ink may have been dry on the original paper. By what means should this copying paper be prepared?

"To members of my own profession who are frequently required to make hurried copies of official documents, the need of such an invention is apparent. I know of no 'sensitive' paper of the kind desired, nor have I sufficient knowledge of chemistry to know whether it could be made, and therefore take the liberty of troubling you for information. It would be necessary, of course, that the chemical ingredient used should not injure the texture or materially impair the color of the document which is to be copied."

We leave it to our ingenious friends to solve this problem and produce the required copying paper.

The Iron and Copper Resources of Great Britain.

The products of the British iron mines in 1865, were 9,910,045 tuns, valued at the place of production at $16,644,025. This was used to feed 656 blast furnaces, and was converted into 4,819,254 tuns of pig iron. Of this 543,018 tuns were exported, and the remainder occupied 6,407 puddling furnaces; and 730 rolling mills were employed in converting it into finished iron. The production of copper has been for some time declining, both in quantity and quality. Last year 82,562 tuns of ore was imported, in addition to vast quantities in cakes, and manufactured.

Patent Hair Restoratives.

The manufacture and sale of hair restoratives has always been a favorite with a certain class of public benefactors, whose disinterested labors have resulted in the foundation of many a fortune. We lately came across the specifications of an old English patent which will, perhaps, be interesting at a time like the present, when alcohol and bear's grease command such fabulous prices.

This patent was for "an apparatus for improving and restoring the human hair," introducing a new feature in this line. By the plan of this inventor combs and brushes are to be constructed of different metals, so that when in use electric currents are given off; "thereby the skin is caused to be stimulated and a healthy action ensues, restoring the hair to its original color, and generally improving its appearance." The same effect may be produced by having the articles formed partly of metal having batteries connected therewith when in use. As the patent claim long since expired, the above method is open to any enterprising individual wishing to experiment.

MISCELLANEOUS SUMMARY.

THE work on the Central Pacific Railroad, in California, is rapidly progressing. It is expected that next month it will be completed from Sacramento to Cisco, ninety-three miles. The work of railroad building in this lofty and rugged region, ascending from 3,600 to nearly 6,000 feet above the sea, is very heavy—a succession of deep cuts and huge fills; but the host of Celestial laborers, under the energetic control of Saxon and Celt, is so numerous that the mountainous obstacles are "here to-day and gone to-morrow."

THERE are 1,000 telegraphic offices in Europe. Africa is connected with the Continent by two lines. Egypt and India have each two routes. The latter contains 161 stations; the island of Ceylon has four more. Dispatches for China pass through Russia, thence to the frontier towns of Tartary, where, received by horsemen, they are delivered through the Empire, reaching Pekin.

FIFTY thousand pounds of powder in a cartridge and rocket factory at Constantinople, exploded on the 19th of July, killing 72 persons and wounding 24. Fragments of the killed were picked up more than a half mile distant, and not the smallest piece of the building remained to show where it had stood.

A CONVENIENT and economical mode of draining and drying sensitized photographic paper, is by placing the sheets between clean white blotting paper to remove the superfluous solution, instead of hanging up the paper to dry.

THE *Engineer* reports that Mr. Jos. Snider, the inventor of the system of converting Enfields adopted by the Government, is suffering from paralysis of the brain, said to have been greatly accelerated by the worries and anxieties caused by his uncertain and harrassing relations with Government boards.

THE Montreal *Gazette* states, on the authority of an experienced marksman, who has repeatedly practiced with breech-loaders, that the grease is liable to clog the metallic cartridge in cold mornings, and seriously affects the efficiency of the weapon, making it comparatively useless.

THE Imperial Commissioners of the Paris Exhibition have made special arrangements for an exhibition of the weights and measures of all nations, a conference will also be held with a view of establishing one system throughout the world.

IN excavations now being carried on in Paris, four mines are fired simultaneously by an electric battery; a surface of over two acres is thrown up at each explosion.

A MAN in Buffalo claims to have discovered that sheet iron will serve for belting in place of leather or rubber. We have not much confidence in the utility of this improvement.

A BRICK YARD is to be established in Chicago having facilities for making 200,000 bricks a day. The work will commence immediately, and when finished it will be the largest in the world.

PRUSSIA gains by the last treaty 42,584 square miles of territory, with an additional population of 7,171,680.

AN exchange says that fresh meat can be kept good and sweet for several days by immersing it in buttermilk.

ONE steam vessel may be considered to perform the work or four sailing craft, each of the same tunnage.

THE city of Antwerp has been devastated by a petroleum fire to the amount of £250,000.

AT the North pole, either direction is south

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ENGLISH RAILWAY CARRIAGE SIGNALS.

Ever since the murder of Mr. Briggs, by Muller, on an English railway, the English have been racking their brains to invent some means by which the occupants of a car, or of a compartment in a car, can communicate with the "guard," or the engineer. The cars, or carriages, on English railroads are divided into compartments, calculated each for the accommodation of six or eight persons, and when once in, the passengers are held under lock and key, there being no communication between the different carriages of a train, nor between the different compartments of the same carriage. Under these circumstances robbery and even murder are feasible, as has been proved in many other instances beside that of Mr. Briggs.

Evidently, if communication, instant and certain, with the engineer or conductor, is of value on any road, it should be on roads managed in this manner. The English style of railway carriages has its advan tages over that of our roads, where all, without regard to character, age, nationality, or disposition are indiscriminately herded together; but it is as evident that it has also its disadvantages and dangers. We secure immediate connection with the driver of the train by a simple cord passing through loops on the ceiling of the cars, and connected between two carriages by a snap catch. By this cord the whole train is connected, the passengers in the rear car having equal facilities, with those of the forward car of communicating with the engineer. A pull of this cord will ring a bell in the engine cab, and the engineer instantly sounds "down brakes" and reverses his engines.

But this is not the English style; the following is from the London *Athenæum* :—

Each compartment is fitted with a "lever box," each box bearing an engraved tablet of instructions in the following terms: "To communicate with the guard for stopping the train, pull the lever."

The effect of a passenger pulling the lever is to set a bell ringing in each of the guard's vans, and these bells, when once so started, will continue to ring until stopped by the guard. The guard of the rear van (who is the guard in charge of the train) then depresses a key, which rings a bell on the engine. The attention of the engine-driver being thus aroused, he consults a galvanometer which is attached to the bell, and upon that he finds exhibited, in a simple and unmistakable manner, the signal "Stop instantly," or, "Stop at next signal station." The driver acknowledges by his engine whistle.

The rear guard uses his discretion as to whether the train shall be stopped instantly or at the next signal station. Of course, if he sees any danger to the train he will give the first-named signal. When a lever has been pulled, it can only be replaced by the guard, who has to unlock the box containing the apparatus, and reset the lever; repudiation by a passenger of having given the signal is therefore effectually checked.

We are not informed how long a time elapses between the act of pulling the lever and the stopping of the train. The "rear guard," who can know nothing of the cause of the alarm, "uses his discretion" as to when and where the train shall be stopped, and acts accordingly. But we are relieved by the statement that "of course, if he sees any danger to the train he will give the first-named signal," *i. e.*, to "stop instantly." Imagine, for a moment, the "guard in the rear van," or carriage, seeing danger ahead, or being cognizant of a murder or robbery in one of the forward cars, or a forward compartment of the "rear van." Certainly, the inventor of this lucid and useful improvement should be knighted at once. Electricity with "levers," "en graved tablets," "keys," and "unmistakable signals" to stop a train!

This stupendous invention is the result of years of study and endeavor by the inventors of Great Britain. A cord passing through a train and through each compartment of a car, is not exclusive enough, or too Yankeefied for English approbation. If they keep at it, possibly before a new generation comes upon the stage they will succeed in improving upon the Yankee style.

The Breaking of Watch Springs.

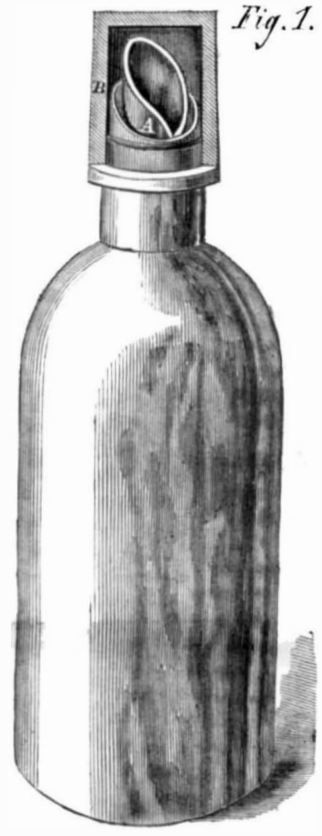
In reply to the inquiry of a correspondent, published in No. 11, present volume, we have received two communications. One writer says he has made careful examinations of several springs immediately after breaking, and found that they were corroded at the point of fracture, principally on the edges, caused, he believes, by the perspiration of the hand in repairing them. The corrosion acting slowly, the spring seldom broke till some time after the watch had been repaired.

Another attributes the breaking to oiling the spring, as a mainspring will break just as soon by oiling it without cleaning it or removing it from the drum, as it would if uncoiled and again recoiled. The oil, he thinks, unequally penetrates the spring, weakening the enamel, and advises that the spring be oiled sufficiently, when the watch is first made.

MYER'S STOPPER AND DISCHARGE SPOUT.

Much annoyance and dirt are occasioned by the adherence of some liquids to the outside of the vessel from which they are poured, and difficulty is often experienced in measuring, by drops, a portion of medicine from the apothecary's common tincture

Fig. 1.



vial. The object of the improvement illustrated in the engravings is to remove these annoyances and difficulties. It consists of a discharge spout, with or without a cap, which can be applied to any suitable vessel, as bottles, vials, sirup pitchers, jugs, dippers, gravy dishes, oil cans, etc.

Fig. 2

The discharge tube, A, may be made of glass, or metal, either surrounded with cork, or fitted snugly to the mouth of the vessel, or it may be a fixed and permanent portion of the vessel, as in the graduating glass, Fig. 2. For vials, bottles, and sirup pitchers, a cap, B, is provided, made of glass, or metal, which fits snugly over the cork exterior of the spout, or is ground air-tight on the discharge tube. The principal feature of this improvement is an inclined channel surrounding the spout, which receives the waste and returns it to the vessel, without allowing it to flow down the outside. It appears to be a very neat and handy device, capable of extended application.

Patented through the Scientific American Patent Agency, April 3, 1866, by Dr. L. B. Myers of El-

Fig. 3

more, Ohio, whom address for additional particulars.

TRACTION ENGINES AND ROADS.

A correspondent sends us a description of a traction engine built in Paterson, N. J., with an account of its trial performances. As he neglects to append his signature to the article, we have no means of judging of the reliability of his statements, and decline to express an opinion on the merits of the machine. Undoubtedly the builders, if ultimately successful, will make all the facts concerning the machine public.

We think traction engines can be built to be used economically in this country. They find little difficulty in working them in England. Our common roads, however, should be made better and more permanent than is the custom now, before they can be introduced to become generally useful. This subject of roads is one that should receive much more attention than has heretofore been bestowed upon it. Not every ordinary laborer is capable of laying out a road. It is a work important enough to be confided to eminent engineers, and engineering talent should be employed in its construction. A road is not intended for a temporary structure. It is for us, our children, and our children's children, and when once located, by the best and most feasible route, should be built and maintained in the best of order. A permanent roadway, although more costly at first than some of the wretched apologies for roads which are to be found all over the country, is much cheaper as requiring fewer repairs, which often absorb in a few years as much as the total first cost. To be sure there are specimens of good roads in this country. Not to speak of park drives and private ways, there is a length of four miles between Providence and Pawtucket, R. I., which is as fine a road as can be found in the country, and which is always kept in good repair.

When our roads are properly constructed, built for permanency, rather than for present necessity and convenience, we may expect to see traction engines a practical success, and not before.

On Coloring Photographic Slides for the Magic Lantern.

The following excellent and practical instructions for coloring photographic and other transparencies for the lantern are extracted from a manual on the Magic Lantern, published in London.

APPARATUS.—The easel, an assortment of brushes and dabbers, an ivory and a steel pallet knife, a small muller and slab, a pallet, a penknife, an etching point, lithographic pens for outlines, pieces of linen or cotton rag.

MEDIA.—Oil of spike, lavender, turpentine, varnish, oxgall, Canada balsam.

COLORS.—Italian pink for yellow, Prussian blue, Antwerp blue, crimson lake, crimson.

These are the three primary colors, which are capable of yielding nearly all the rest by judicious mixture. The colors purchased should be those pre-

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pared for oil painting, in collapsible tubes, and the purpose for which they are intended should be explained to the color maker.

The use of the muller and marble slab in well rubbing these colors down will be learned. For black, ivory or lamp black is used; for white the glass is left uncolored; for green, Prussian blue and Italian pink; for purple, lake and Prussian blue; for orange, lake and gamboge; for brown, either burnt sienna or a mixture of Prussian blue, lake, and Italian pink.

GLASS.—Patent plate and flatted crown are the two kinds obtainable. The former is expensive and only necessary to be used when something of an exceptionally superior character is to be produced. The latter will answer most purposes if the following precaution be observed:—The two sides differ from each other, one being smooth and the other having gritty particles, which may be distinguished on drawing the nail across. The painting should be done on the smooth side, or if the photograph be prepared with a view to subsequent coloring, it should be taken on the smooth side.

A good medium for mixing the colors is transparent oil varnish to which a few drops of liquor ammonia have been been added.

In the case of a photograph, no preliminary outlining is required, but where it is intended to reproduce a large engraving on a three-inch disk, a reduced outline of the required size is first made upon paper, and this being laid under the glass, the outline is traced through with the appropriate material. This outline is then protected by a coat of varnish, the coloring then begins, the sky first and then the extreme distance, and successively the middle distance, and the foreground, increasing in intensity of color and decision of outline as the objects approach the spectator. The required depth of color will regulate the amount of varnish to be used, and small dabs should be made on a piece of glass before beginning to paint, in order to ascertain the quality, transparency, and depth of colors. The remedy for excessive opacity is more varnish and ammonia. Two or three drops may be added to a teaspoonful of varnish.

The lithographic pen is to be used for tracing the outline.

Dabbers are made by burning down thick camel's-hair brushes to a round, stumpy end.

Another and very satisfactory method of coloring consists in using aniline colors, known as Judson's dyes; or better still, those prepared by Dr. Jacobsen for coloring photographs. In using these colors the disagreeable smell of oil and varnishes is avoided, the only medium required being water.

Before using the colors, it is imperatively necessary that the glass on which the design is either sketched or photographed should be coated with albumen. When dry it is ready to receive the colors, the albumen acting as a mordant; a plain piece of glass should also be coated with albumen, on which to try the depth of colors; and great care must be taken to keep the coloring within the outlines, as, being dyes, these colors cannot be removed.

To prepare the albumen, take the white of an egg, and add to it one ounce and a-half of water, beat all to a froth, and the liquid subsiding is fit for use.

FIRE LIGHTING IN OLDEN TIMES.

The refrain of an old ditty, the text of which we cannot recall, had a bit of advice which would not be appreciated now-a-days, it was—

Fire upon the mountains,
Run, boys run.

Why and in what direction should they run? Evidently to the mountains, not, as Lot did, to escape fire, but to get it. Why? Because fire was precious and scarce; as precious as that which fabled Prometheus stole from heaven, and more precious than diamonds, which light but do not heat.

How many who read this issue of the SCIENTIFIC AMERICAN, in this year of our Lord, 1866, can remember when the preservation of the hearth fire was a duty as exacting and necessary as that of the virgins in the times of Roman greatness, who were intrusted with the care of the altars raised to Vesta? Possibly many, but not all.

We confess to no "vigorous old age," yet we well remember when the last care of the housewife, after securing the door and trying every window, which duty she repeated three hundred and sixty-five times every year, was to carefully rake together the "live" coals, place the brands against the backlog, and cover all with the ashes. How she carried her tinder box, steel, and flint into her room, always sure there was enough of "punk" or charred linen rags, called "tinder," to enable her to strike a light at call. How on a cold morning when—

"The roads were dumb with snow,"

we have gone with shovel to the nearest neighbor, or further, for a portion of the precious element, which the gods deemed necessary for man in order to enable him to rise to their high estate. All this we remember.

In every house was a tin box, a round tin cup, rising some inch-and-a-half at the sides, in which was a quantity of "tinder." On that was a plain disk as a cover, and over all a lid which had on its upper surface a socket for a candle. A flint—a common gun flint, much more common then than now—and an old file. This was the fire-raising apparatus. The flint in the right hand, the steel in the left, its point raised above and pointing to the "tinder," a few strokes of the flint against the steel and a faint spark is evoked from the tinder. To make that spark a generating blaze, a slip of dry pine wood, its end dipped in melted brimstone, sufficed. These splinters of sulphur-tipped shavings were the originators of the present lucifer match, and in our boyhood days we have spent many an hour in shaving them from the block, a labor which, as a pastime, would have been pleasant, but as a task was irksome.

After a while came the phosphorus matches, which, when dipped in a vial, ignited on exposure to the atmosphere. These were costly and never came into general use, being shown as curiosities rather than employed as conveniences. Then came the present match, variously named as "loco-foco," "lucifer," and "friction" matches. The process of this manufacture has already been detailed in our columns. When these friction matches first came into use they were subjected to great opposition from the press, on the score of the facilities they afforded incendiaries in prosecuting their nefarious work; and for many years hundreds refused to use them. But their undoubted convenience and utility triumphed over all prejudices, and the friction match is now considered a necessity. There is no single article more extensively used, there being manufactured in this country alone one hundred millions daily.

PRINTING OF WOVEN FABRICS.

Popular apprehension usually confines the application of the "art preservative" to the multiplication of books, newspapers, or other periodicals, and the permanence of ideas which, spoken only, would be evanescent and die with their originator or his cotemporaries. But, although the preservation of ideas belongs mainly to that adaptation of printing which gives to writing its lease of life, by indefinite multiplication of copies, an idea may be as surely protected, if it appeals to the fancy and innate love of beauty, as though it confined its appeal to the intellect exclusively.

Printing is truly the "art of arts." It reproduces indefinitely the theories, ideas, and practical facts of thinkers and workers, and it as well subserves the purposes of him whose object is to appeal to the fancies and tastes of all classes. The production of figures on cloths is as really printing as the preservation of ideas by means of the letter type. The decoration of plain cloths with figures is one of the oldest of arts. It was practiced by the ancients, and the Chinese and Aztecs were in possession of the art when they became first known to Europeans. To this day the Chinese use the same method in printing cloths that they do in printing books. In the latter case we have improved upon their process in using movable types, instead of engraving on and printing from the blocks—we using in our stereotype process the movable types to produce the block, whereas they engrave the block itself. In the former case it is but a few years since machine printing took the place of hand block printing in figuring calicoes.

This method of producing colored figures on cloths by means of printing, should not be confounded with dyeing, although by a previous protection of those portions of the fabric not intended to be colored, dyeing has been employed to make figured cloths. Printing deposits the colors directly upon the cloth, which are secured there by mordants. This art, brought from the East, found its way into England about the year 1676. We will briefly describe the process formerly used.

"Block printing" of calicoes was comparatively a simple process. The web of white cloth was sent to the printing shop, either in a bleached state, or dyed some color which formed the ground. Previous to being submitted to the manipulations of the printer it was "calendered," or pressed between heavy rollers, which gave it a perfect surface. It was then ready for the printer. He worked at a table, wide enough to accommodate the fabric, and six or seven feet long. The roll of plain cloth lay at one end of the table on a platform, and was drawn up over the table, which was of stone and covered with a thick felt blanket. Behind him was a tub, some thirty or thirty-six inches diameter, partially filled with a mixture of common pitch and a vehicle which held it in solution. Floating on the surface of this yielding mass was a piece of woolen cloth stretched tightly over a hoop. A pot of the requisite color stood at the side, and the attendant, or "tearer," as he was called, with a flat brush smeared the hooped woolen sieve with the color. The printer was furnished with a "block," corresponding in length and width with the pattern to be printed, the face of which was cut in relief, as are the blocks used now in printing wood cuts. By dipping lightly the block in the sieve, floating on the yielding surface, it took up enough of the color to make an impression on the cloth. The cloth being drawn tightly over the table presented a smooth surface, upon which, by repeated applications of the block, its pattern was produced and reproduced indefinitely, the "tearer" smearing the sieve with fresh color in each interval. The printer was guided in placing his block by a minute pin inserted at a corner of his block. The cloth on the surface of the table being printed, it was wound up over rollers traversing the room on racks, so that when it came back by the series of rollers to the end of the table, it was wound perfectly dry upon a shaft, from which it was taken to be "lived" or "raised."

This is, in brief, the *modus operandi* of block printing in its simplest form. It will be seen that several applications of the block were required to cover one single transverse section of the fabric, and many repeated applications to print a full web of thirty or forty yards in length. Sometimes the ground itself was applied by blocks. In such a case the figure was first printed with the block cut in relief, and then the fabric was reprinted with a block cut in intaglio, the figure being sunk into its surface, and the surface itself being faced with woolen or felt, to convey a large portion of the coloring matter. Another style was that of printing several colors or shades at once by means of an apparatus which fed different colors at the same time. Technically this was termed a "hokey-pokey" tub. The deposition of the colors, held in reservoirs, was effected by the pressure of the block, in dipping, acting upon compressed air.

This block printing is still employed in the printing of silk handkerchiefs, each one of which is a single pattern, and largely in the printing of floor and table oil cloths. In the latter case the coloring matter is not a dye, but a paint, and is deposited mainly on the surface of the fabric.

Machine printing by means of engraved copper rollers, has now taken the place of block printing, and that we shall make a subject for another article. When machine printing was first practiced in England and France, the colors used were not deemed "fast," and much prejudice was excited against the product of the new process. Hand-printed calicoes were eagerly sought after, and as the process of hand printing could not be so accurate as that done by machinery, those who studied economy rather than show, sought eagerly, in their selection of calicoes, for evidences of faults to make sure that they were getting the genuine article. The shrewd suppliers of our markets abroad soon ascertained the

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fact, and sent to this country imperfectly-printed goods, printed by machinery, to suit the queerly-fastidious tastes of the purchasers in the American market. Labor-saving machinery, however, ultimately triumphed over old and slow processes, and the days of block printing were numbered.

UNSCIENTIFIC INVENTORS.

In a discussion before the British Association, at its recent session, Mr. Felkin stated that since 1780 no less than six hundred and sixty patents for inventions connected with the lace manufacture had been granted, all of which, but some half dozen, had been made by the workmen themselves, while during the last fourteen years machinery to the value of two millions of pounds had been laid aside as being unfitted for the attainment of the result desired.

It may seem strange that so many patents have been taken out for one branch of industry, but we think the sewing machine and the steam engine, as individual improvements, would show a more wonderful fertility of talent, although possibly both of them combined would not exhibit so many separate inventions. The manufacture of lace is an intricate process, and since the first introduction of lace as an ornament of wearing apparel, several hundred years have elapsed. It was first made entirely by hand with a patience of application and an untiring energy like that of Bruce's spider; but when machinery, created by the inventive genius of man, usurped the place of the patient, plodding "pillow lace" workers of Germany, a vast field was opened for improvement in the processes of the manufacture.

As a means of accounting for this large number of inventions in this one branch of industry, it was stated that the want of a scientific knowledge of mechanics was the probable cause, the unscientific workman not having a comprehensive and clear idea of the means necessary to produce the result desired, feeling his way and toiling by slow steps toward the attainment of his object. There certainly is a good deal of force in this supposition, yet we can scarcely subscribe to the idea which seems to be embodied in it, that inventions when discovered by scientific mechanics are always, or even generally, produced as finished and perfect creations. There may have been cases where an invention became at once a success, incapable of radical improvement, soon as embodied in a practical form; but such instances are rare. Improvements in mechanism are of gradual growth, accretions, and not springing complete, perfect, and ready armed from the brain of the inventor, as Minerva from the head of Jove. Genius, however much the popular idea may elevate it above plain, plodding talent, is always a worker; and he who hopes by the aid of science to leap at once to the goal desired will be disappointed. In the progress of invention the object to be attained is the first element, the second the means to be adopted, and both these must be reached by patient removal of obstacles and gradual surmounting of difficulties as they arise. It requires a prescience more than human to foresee and provide against all contingencies in the perfection of an invention. Practical experiments are the means by which the inventor reaches success, and no amount of theoretical knowledge and scientific attainment will open a royal road to inventive success.

Yet it is as certain that science, and an intimate knowledge of the laws of mechanics, much shorten the labor of putting a mechanical idea into a practical form. Indeed, if the inventor is destitute of this knowledge, he must expect that the obstacles in his way will be increased in number and become more formidable in character. He will blunder where he should conquer, and will repeat the futile experiments of others in endeavoring to violate, or nullify, the plainest laws of mechanical science. To this ignorance must be attributed the persistent and repeated attempts to construct a self-acting and power-generating machine—a perpetual motion. A lamentable instance of the necessity of at least a general and superficial acquaintance with the simple laws of motion came to our knowledge a few days ago. A correspondent desired to know some means by which an eccentric, or crank, could be made to advance a valve forward eight inches and bring it back only four and a-half inches. He seemed to have the idea that all things were possible to mechanics.

While it cannot be denied that the work of the inventor is a slow and laborious one, even with all the aid which scientific knowledge can render, it is no less true that this knowledge will avail to protect him from the chagrin and disappointment of repeated failures. At least a certain familiarity with the general laws governing matter, if not a knowledge of mechanical movements, is requisite to success in mechanical invention.

Correspondence

Steps for Turbine Wheels.

MESSRS. EDITORS:—On page 85, current volume of the SCIENTIFIC AMERICAN, under "Notes and Queries," I notice your answer to M. E. of N. Y., on the subject of steps for turbine wheels. You say lignum-vitæ, rock maple, or hickory, prepared by boiling in oil, and used with the grain parallel with the shaft, would make as good a step as he could obtain. To the above you might add live oak prepared in the same way, and for the benefit of M. E., and the numerous readers of your very valuable paper, allow me to inform them that the knot of the Southern pine, commonly known as lightwood knots, from its rapid ignition, makes the best step. I do not believe it is much known at the North, but in North Carolina, South Carolina, Georgia, Alabama, Mississippi, and Florida, where it abounds, this knot is well known and has been tested with live oak, hickory and dogwood, and proved superior for steps. There is no necessity of boiling it in oil, as it is full of resin and sticky to the touch, is very hard and brittle; a nail cannot be driven into it without fracturing it in some way, the fracture running as often across the grain as with it, resembling much the first fracture of ice when a sharp pointed instrument is driven into it.

For further information I have procured three dry or seasoned specimens, which being accurately dressed to 3 inches square by 6 inches long, and weighed on scales denoting one-fourth ounces, give the following results:—

1st—3×3×6=54 cubic inches, weighed 2 lbs. 5½ oz.
2d—3×3×6=54 cubic inches, weighed 2 lbs. 4¼ oz.
3d—3×3+6=54 cubic inches, weighed 2 lbs. 8 oz.

3×3×18=162 cubic inches weighed 7 lbs. 2 oz. =76 lbs. to the cubic foot. Llignum-vitæ being 83·4 to the cubic foot, it will be seen that these knots are nearly as heavy, and I believe specimens can be procured equally as heavy. They can be had in great abundance from 5 to 10 inches in diameter, and the stump and roots of the tree, equally as good for steps, can be had from 12 to 20 inches diameter.

O. T. GIBBES.

Augusta, Ga.

Black Oxide of Manganese.

MESSRS. EDITORS:—In answer to "E. H. L. of Mo," in last week's SCIENTIFIC AMERICAN, we would state that there are mines of oxide of manganese in California, Ohio, Virginia, and near St. John, N. B., from the latter of which large quantities are being constantly shipped to the bleaching powder manufacturers of England, beside being extensively used here in the manufacture of glass, steel, varnish, refining of coal oil, etc. For the manufacture of crystal glass, which requires the best article of manganese, the New Brunswick has been pronounced by New York, Boston, and Pittsburgh manufacturers equal to the best Saxon.

MERRITT W. GRISWOLD & Co.
Agents for N. B. Manganese Mines.

New York, Sept. 14, 1866.

Measuring and Regulating Temperature.

MESSRS. EDITORS:—I notice on page 115, current volume, you invite subscribers to come to the rescue of Mr. Brown, in the matter of regulating temperature. In response, I would suggest that he take his compound bar, or "thermostat." and knock out all the rivets but one, at one end; then take a strip of steel, one inch wide, two feet long, by one-sixteenth of an inch thick, drill two holes near one end, perhaps one-quarter inch apart, in line with the length of the piece, then rivet through one hole to the steel, and through the other to the brass bar, so as to let it form nearly a right angle; the other end of this arm will then describe an arc of some extent, as the temperature varies. Now let him find by trial what point of this arm "moveth itself aright," and then connect with his valve—having placed the apparatus in a suitable position—and it strikes me it will work with sufficient power to answer his purpose. The rivets must not be too tight, and the long bars must be confined sufficiently to prevent buckling.

ENOS GROUT.

Fall River, Wis.

A Meteorological Phenomenon.

MESSRS. EDITORS:—A phenomenon was witnessed here yesterday, at about half past five P. M., which I deem worth reporting. A brisk shower was followed by a rainbow of most intense brilliancy, and characterized by other features of more than ordinary interest. Not only were both the arcs remarkably perfect and distinct, but the space between them exhibited a very decided shade of color, which, without assuming to speak with entire accuracy, I should say was between violet and purple; so that a portion of the mountains behind, when seen through the medium of this colored space, was considerably darker than the adjacent parts. There was also plainly visible a duplicate of the violet or innermost band of the lower arc, and separated from it by a dark lead-colored band, of about the same width as the duplicate, and both of them very clearly defined. A third curious feature of this scene was the fact that the primary or lower arc was in many places crossed and obscured by what seemed to be clouds which had arranged themselves in the form of radii of the circle of which the arc was a part. Their form was not that of rays of the sun as seen through clouds at sunset, but rather that of the irregular streamers or patches of aurora borealis, except that they were of the color of the other clouds, and had not the motion of auroral flashes. Had these streaks occurred only at the crown of the arc or vertical to the earth, it might be thought they were the ordinary appearance of rain falling from a distant cloud; but, in fact, they were much more plentiful at the ends of the arc than at top, and were unmistakably arranged with reference to the center of the circle. They also continued as long as the arc was visible.

J. R. LEUTE.

Washingtonville, N. Y., Aug. 24, 1866.

ORIGIN OF THE SIGNS + AND —.—A recent writer in the *London Athenæum*, gives the following as the origin of the signs + and —. He says: The first of these signs is a contraction of *et*. The course of transformation from its original to its present form may be clearly traced in old MSS. *Et* by degrees became &, and & became +. The origin of the second (—) is rather more singular. Most persons are aware that it was formerly the universal custom, both in writing and printing, to omit some or all of the vowels, or a syllable or two of a word, and to denote such omissions by a short dash, thus —, over the word so abbreviated. The word *minus* thus became contracted to *mns*, with a dash over the letters. After a time the short line itself, without the letters, was considered sufficient to imply subtraction, and by common consent became so used. Hence we have now the signs + and —.—*Annual of Scientific Discovery*.

THE Philadelphia *Press* notes the setting of a mill on fire in that city by the engineer attempting to temper a spring by plunging it, red hot, into a can of lubricating oil. The oil exploded and set the building on fire. It evidently was mineral oil, as no animal or vegetable oil contains explosive elements. This may serve as a warning to those using petroleum as a lubricator. The experiment was a foolish one, for mineral oil is totally unfit for the purpose of hardening steel.

CLEANING horses by machinery is announced as the latest English improvement.

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NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees :—

WHIEFLETREE.—FRANK CLEMANS, Lafayette, Ind.—This improvement consists in the combination of a spring and pin with a clevis or strap having for its object a means of detaching the horse or horses from the vehicle in case they become unmanageable and likely to peril and jeopardize the lives of the occupants of the carriage.

REGULATING REGISTER FOR TIMEKEEPERS.—WM. M. BEEMAN, Hartford, Conn.—This invention consists in the employment of two registering devices in connection with the ordinary regulating lever of a watch, one register being used to record the deviation of the watch during any given space of time, and the second register being to record the distance and direction which the regulator is moved the first time for correcting the said deviation; so that the regulation of timekeepers is, in this manner, reduced to a simple calculation, and the correct point for setting the regulating lever is readily found after the first set of observations. The process is much simplified, and has important advantages over the rambling method by which the correct point for setting the regulating lever has heretofore been found.

FAUCET.—G. R. HUNTLY, Taunton, Mass.—This invention consists in the employment of a screw clamp in combination with an adjustable coupling or nozzle in such a manner that the nozzle may be adjusted to any desired point or may be removed.

COMBINED WHEAT DRILL AND ROLLER.—ORSON ARMSTRONG, Gillespie, Ill.—This invention consists in so constructing a machine that wheat may be sown in drills by it, and it may be used for a corn planter. It is also provided with rollers so as to roll the ground after the planter.

PLOW.—TILLMAN RAMS, Keokuk, Iowa.—This invention consists in providing a socket in the point of a plow for the purpose of admitting the end of the shoe or bar upon the lower edge of the landside for the purpose of fastening and securing the same to each other.

IRON FOUNDER'S CLEANING MILL.—STEPHEN D. HORTON, Peekskill, N. Y.—The object of this invention is to furnish an improved cleaning mill by means of which the metal remaining in the material left in the furnace, when the melted metal is drawn off, after being crushed or ground, may be separated from the dirt readily and without waste of the metal.

OX YOKE.—E. G. GALE, Holland, Mich.—This invention consists in securing the bows to the yoke by means of a rack bolt in combination with a toothed segment engaging with the teeth of such bolt and operated by a suitable lever or handle.

WAGON BRAKE.—THOMAS T. WIER, Gallatin, Mo.—This invention consists principally in the combination with the neck yoke, tongue, forward bolster, and brake bar, of a rod jointed in two places, to accommodate it to the upward and downward movement of the tongue and to the right and left horizontal movement of the forward wheels in turning.

CONDENSER.—J. C. WHARTON, Nashville, Tenn.—This invention has for its object to furnish a condenser by means of which the products of distillation may be condensed quickly and thoroughly. And it consists of a number or series of hollow disks connected with each other and placed in a water tank.

SPRING DIRK KNIFE.—CHAS. HIBBARD, Chicago, Ill.—This invention consists in the employment or use of a spiral spring placed behind, or in the rear of the blade, for instantly throwing out the same, no matter what position the knife may be in when the blade is released.

FENCE.—SAMUEL CROCKER, Oakland, Iowa.—This invention consists in the combination and arrangement of the stakes or braces and binding bar with the adjacent ends of the linear panels, and in connecting the adjacent ends of the panels at the corner with each other by passing the notched projecting ends of the horizontal bars of the one panel through mortises formed in the end upright of the other panel, and securing them in place with keys or wedges.

BRAKE FOR SLEDS.—H. L. NARAMORE, Cummington, Mass.—The nature of this invention consists in the employment of two pivoted levers, one end of each being connected to the pole at its rear end, and the other ends connected by rods to elbow levers that connect with the brake.

COMPOSITION FOR PRINTERS' ROLLERS, ETC.—LEANDER R. BINGHAM, New York City.—This invention relates to a composition which is intended particulary for printers' rollers, but which can be used for a great many other purposes, in some cases as a substitute for india-rubber. Its properties are such that it readily takes up printers' ink, and that rollers or other articles made from it preserve their softness and elasticity for a long time.

FASTENING FOR CARPETS, ETC.—CHRISTOPHER GULLMANN, Poughkeepsie, N. Y.—This invention consists in the arrangement of flat or concave rods which are provided with teeth bent down from one or both edges in combination with screws or other suitable means for fastening the same to the floor, so that by such rods a carpet or any other textile or flexible fabric can be readily stretched and held in position, and by removing the rods the carpet or other article can be taken up without injury.

LAP JOINT FOR BELTING.—HENRY UNDERWOOD, New York City.—The object of this invention is to furnish an improved lap joint, by the use of which a belt of nearly uniform thickness and strength may be produced, and at the same time the amount of stock used may be economized.

VALVE FOR WATER-SUPPLY PIPES.—WILLIAM KEARNEY, Belleville, N. J.—The object of this invention is to obtain a valve for water-supply pipes which will not be rendered inoperative by means of stones, sticks, or other foreign substances interposing themselves between the valve and its seat. The invention has also for its object the ready starting of the valve under a heavy pressure of water, and a quick and rapid movement of the valve after the same has been started, and a suitable provision made for the escape of air from the valve-chest, and to prevent the freezing up of the valve in its chest,

FRUIT DRIER.—WILLIAM D. FISHER and WILLIAM HOLLY, Freeport, Ill.—This invention consists in having a double flue in combination with the furnace and drying chamber of a fruit drier, for the purpose of causing a draught through said drying chamber, and in a fruit tray formed of lath and canvas, in combination with the furnace and drying chambers, and with the walls of a fruit drier.

CURING RHEUMATISM, ETC.—LOUIS FOUILLOUX, Clermont Ferrand, France.—This invention consists in the external application of oxygen gas, in conjunction with heated atmospheric air, to the parts of the human body which are afflicted by rheumatism and other similar diseases, in such a manner that the vitality of said parts is renewed and increased, and the diseases are counteracted and cured.

APPARATUS FOR MAKING VINEGAR.—THEOD. GRUNDMANN, St. Anthony, Minn.—This invention relates to an apparatus in which the liquid which is to be transformed into vinegar is made to pass through a series of troughs, which are placed in a slightly inclined position and covered up, leaving air channels which allow the atmospheric air to circulate freely over the surface of the liquid passing through the troughs in such a manner that if said troughs are first saturated with vinegar, and beer, cider, or other suitable liquor is passed through them, said liquor is transformed into vinegar, and all danger of overheating or putrefaction is avoided.

PISTON PACKING.—A. W. JACKSON, Centralia, Ill.—This invention has for its object to furnish an improved piston packing, simple in construction and self-adjusting, in which the pressure of the packing against the inner surface of the cylinder shall be in exact proportion to the pressure of the steam upon the face of the piston.

WHEEL FOR VEHICLES.—RICHARD WALKER, Batavia, N. Y.—The object of this invention is to furnish a means by which the tire of a wheel may be tightened without resetting the tire.

MACHINE FOR STRIPPING FILE BLANKS.—T. COLDWELL, Matteawan, N. Y.—This invention consists in so constructing the holders for the file blanks as to receive and hold blanks of varying lengths, and also in so arranging them that, while the file blanks will be firmly held to the action of the stripping tool, they can adjust themselves thereto; and also in imparting to the stripping tool a reciprocating rectilinear movement over the file blanks in the direction of their lengths, so that, without arresting the movement of the stripping tool, the blanks can be removed from the machine, and reversed in position or new ones inserted, as may be desired.

SEAMLESS POCKETS FOR GARMENTS, BAGS, ETC.—GUSTAVE KOTTGEN, Barmen, Prussia.—This invention has for its object the production of seamless pockets for garments and seamless bags, in order to secure, among other things, the qualities of durability, strength, economy of labor in preparing them; and it consists in producing them by weaving them whole and complete in a loom, without any seam whatever.

MUSICAL INSTRUMENT.—GEORGE C. WOODS, Cambridge, Mass.—The object of this invention is to improve the manner of operating the stops of musical instruments.

CARRIAGE SEAT.—LUTHER J. WOODRUFF, Mohawk, N. Y.—This invention relates particularly to that class of carriage seats known as "tub seats," and it consists in the use of metallic castings for the corners of such seats, whereby a great saving is effected both in the expense and labor of manufacturing, at the same time securing increased strength and durability, as well as superiority of finish.

FIRE-ARM.—F. SCHENK, San Antonio, Texas.—This invention relates to the arrangement of a hair trigger for Colt's and other revolving pistols, which is so constructed that it may be adjusted to any one of said pistols without the assistance of a gunsmith, the only tool required for the purpose being a screw driver.

PORTABLE FIELD FENCE.—JER. WHITESIDE, Coesse, Ind.—This invention has for its object to furnish an improved fence, strong and substantial, without its being necessary to set posts in the ground. It is so constructed that the timber will have no chance to warp or twist, and is so bound together that there will be no strain upon the nails.

STEAM GENERATOR.—C. S. BELL, Hillsboro, Ohio.—This invention relates to an apparatus for generating steam, and has for its object economy in fuel, safety from explosions, and an economical mode of construction.

CULTIVATOR.—WILLIAM J. ANDREWS, Columbia, Tenn.—This invention relates to a cultivator designed for scraping, harrowing, and thinning out plants which are grown in elevated or raised drills, such as cotton, etc.

CUTTING STANDING CORN STALKS.—J. M. GOFF, Ionia, Ill.—This invention relates to a machine for cutting standing corn stalks, and it consists in the employment or use of a cylinder of knives connected with a draught pole and arranged with adjustable wheels, whereby standing stalks may be cut with the greatest facility and very expeditiously, so as to effect a great saving in time and labor over the manual process for effecting the result.

PLOW ATTACHMENT.—O. P. DILLS, Falmouth, Ky.—This invention relates to an attachment for plows whereby any ordinary plow may be converted into a riding or sulky plow.

CULTIVATOR.—JOHN BURNHAM and W. C. LATTRUP, La Salle, Ill.—This invention relates to a cultivator of that class in which the plows are arranged so as to be adjustable both laterally and vertically, and it consists in a novel arrangement of the parts, whereby the device may be manipulated with the greatest facility, the team relieved of weight on the neck, and the device rendered capable of being converted into a single or double one for plowing one or two rows of plants.

CUTTING RUBBER THREADS.—D. W. RUST, East Hampton, Mass.—This is an improvement in the mode of cutting rubber threads, by which the work is accomplished without waste and imperfect incision of the folds of rubber next the revolving cylinder, on which the threads are cut.

WINDOW-SHADE FASTENING.—E. J. STEEL, New Britain, Conn.—This is an improved device for fastening window shades, operated by a single cord, and raising and lowering easily,

GOVERNOR.—THOMAS B. MCCONAUGHEY, Newark, Del.—The governor embraced in this invention is intended more especially for horse-powers, the invention consisting in a novel construction and arrangement of the parts composing the governor, whereby efficiency and perfectness of operation are secured.

SUGAR EVAPORATOR.—ROBERT C. NOURSE, Corydon, Ind.—This invention relates to certain improvements in means for stirring and skimming the juice of the sugar cane during the process of evaporating and concentrating it, whereby the labor attending the usual manipulation is greatly diminished, and the work effected in a thorough manner.

SULKY ATTACHMENT FOR PLOW.—STEPHEN STOUT, Tremont, Ill.—This invention relates to a simple sulky attachment for plows, whereby any ordinary plow may, with the greatest facility, be applied to the attachment and converted into a sulky plow.

WATER WHEEL.—JOHN S. WARREN, Portchester, N. Y.—This invention relates to a horizontal water wheel, and it consists in a novel construction of the scroll and wheel, whereby the water is allowed to pass through the wheel with less interruption than hitherto, and with less friction and a greater percentage of the power of the water obtained.

CAR COUPLING.—DAVID LIPPY, Mansfield, Ohio.—This invention relates to a self-acting car coupling, one which will connect itself when the cars come in contact, and which will disengage itself in case of a car being thrown from the track. The invention is applicable to either passenger or freight cars.

MILL FOR CRUSHING SUGAR CANE.—ALVAH EATON, Madison, Wis.—This invention consists in an arrangement of pressure rollers and a frame, whereby it is believed that a very superior mill for the purpose specified is obtained.

MACHINE FOR SOWING WHEAT, ETC.—CYRUS C. CARTER, Exeter, Ill.—This invention relates to a device for sowing wheat and other grain, either in drills or broadcast. The invention consists in a novel arrangement of runners, and furrow openers, and seed-conveying tubes, whereby the desired work may be perfectly performed by a very simple arrangement of parts.

CULTIVATOR.—M. H. BUCKNALL, Darien, Wis.—This invention relates to a cultivator for cultivating plowed ground, eradicating the weeds therefrom, and pulverizing the soil.

SHEEP AND CATTLE-FEEDING RACK.—J. B. BROWN, Medina, Wis.—This invention consists in a rack having its roof and division-boards pivoted or hinged in such manner that the frame can be opened and the latter placed so as to shield the troughs when the device is to be used as a cattle-feeding rack, and so that the roof may be closed and the division boards thrown up so as to leave free access to the troughs when the device is to be used as a sheep-feeding rack.

SPIKE DRAWER.—SAMUEL HART and JOHN DOUGLASS, Prentice, Ill.—This invention consists in constructing the spike drawer with a joint, in such a manner that it can be used in either an extended position, after the manner of ordinary claw bars, or in a position with the part that carries the claw at an angle with the other part or handle.

RAILROAD CHAIR.—B. MCDEVITT, Belvidere, Ill.—The chair embraced in this invention is secured to the rails by means of the wedge driven into one side of the chair in such a manner as to tightly bind it about and in contact with the rails.

COMBINED SHEEP SHED, HAY CRIB, AND GRAIN TROUGH.—T. P. SIBLEY, Oberlin, Ohio.—This invention has for its object to furnish a convenient means for feeding sheep with grain and hay, and which will at the same time afford them a shelter while feeding.

CONSTRUCTION OF DAMS AND LEVEES.—BENJAMIN BRITTEN, Galena, Ill.—This invention consists in constructing dams and levees in a series of layers or steps, so that should all above any particular layer or step be removed, the remaining part will still constitute a perfect dam.

COVERED VESSELS.—S. E. SOUTHLAND, Jamestown, N. Y.—This invention is designed to so improve the covers of tubs and other vessels, when used to contain butter, lard, etc., as to make them air-tight or nearly so, and, at the same time, much more convenient in use.

SELF-ADJUSTING POLE AND POST PULLER.—IRA HOLMES, South New Berlin, N. Y.—This invention is designed to furnish an improved instrument for pulling hop or other poles or posts out of the ground quickly and easily, and it consists in the combination of a standard, lever, and hook with each other.

MACHINE FOR PURIFYING GAS.—WILLIAM C. TURNBULL, New York City.—This invention relates to an apparatus for purifying gas, which is both self-feeding and self-discharging, and in which the gas is claimed to be purified in the most effectual and economical manner.

BUCKLE.—T. B. BUNTING, New York City.—This invention relates to an improved buckle for shoes, clothing, or harness, by which two straps may be effectually held together, and by which the sewing of one of the straps to the buckle, heretofore necessary, is altogether dispensed with.

PEW AND SEAT HAT RACK.—E. S. BLAKE, Pittsburgh, Pa. Patented Aug. 14, 1866.—This is a useful contrivance for holding gentlemen's hats in churches, theatres, or lecture rooms. It consists of a V-shaped wire or rod, attached under the seat, into which the hat is pressed, the rim resting on the wire, thus preventing contact with the floor. The use of this rack obviates the liability of the hat getting lost or crushed in a crowded assembly room, and is one of the small but useful improvements which we are always glad to see adopted.

SAFETY BRAKE FOR CITY RAILROADS.—J. WYATT REID, New York City.—This invention consists in a downward extension of the car-brakes so that they will sweep obstructions from the track. The especial object is to save life and limb when, by accident, any person falls upon the track. It is a good idea,

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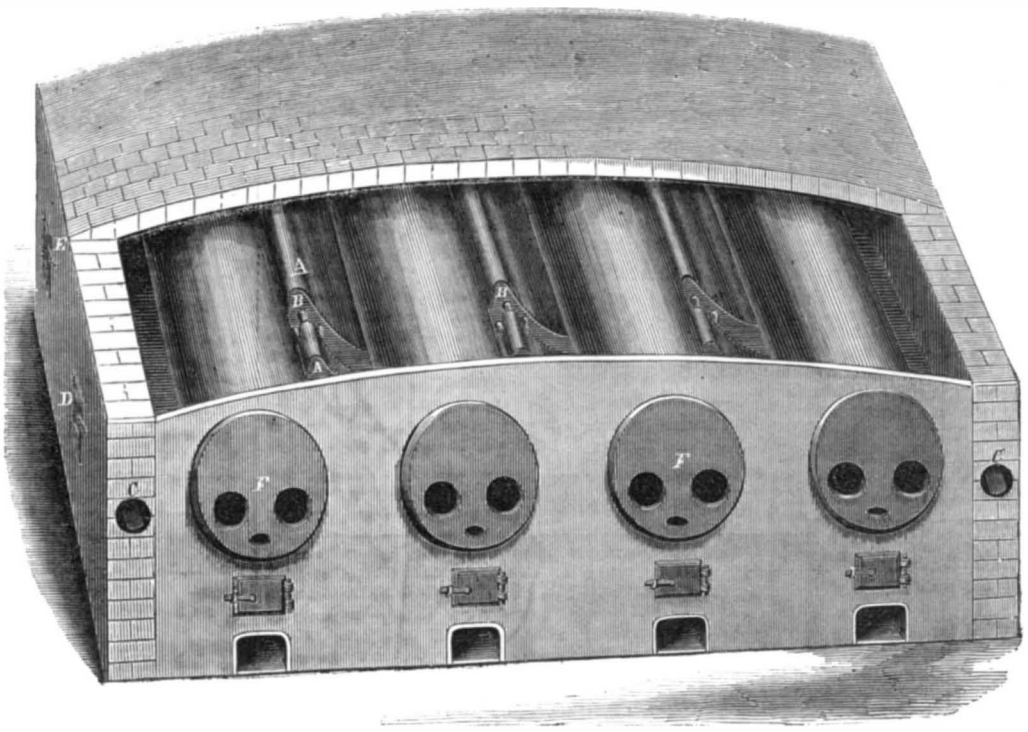
Improved Boiler Furnace.

Boilers set in pairs or groups, in the same bench, do not always operate alike. If the chimney or smoke flue is situated opposite the ends of the central boilers, steam is more easily and rapidly generated in them than in the outer boilers. Consequently these boilers are more exposed to the action of the inflammable gases, and sooner burn out, than those further removed from the line of the egress of the gases. The object of the improvement, illustrated in the engraving, is to regulate and equalize the passage of the smoke and gases along and around the boilers.

The engraving represents a bench of four cylindrical boilers, disposed horizontally. The usual flue space, semi-cylindrical, extends under the boilers and reaches up to their centers, the ridge of intersection forming a longitudinal partition, which is shown at A. Above this point the connection between the outer flues is open and free. A transverse passage, B, extends across these partitions from side to side, communicating at each side with longitudinal passages through the side walls which run from front to rear, and open to the external atmosphere at C. A door, D, on each side, communicates with this transverse passage, for convenience in cleaning. A flue, not shown, is carried across through this passage, which is furnished with tubes, B, projecting upward at an angle. These tubes, in connection with the flues, C, furnish air to the gases and aid in their combustion. The flues under and along the sides of the boilers, with the air passages. C, debouch into a transverse channel—door shown at E—at the rear of the boilers, where the smoke and gases are received and returned through the boiler flues, F.



CLARK'S BOILER FURNACE.

These furnaces are largely in use at the West and give general satisfaction. The inventor is so confident of their superiority that he offers to put them up for the value of the fuel saved in two months by their use.

Patented through the Scientific American Patent Agency May 9, 1865, by Thomas H. Clark, to whom, at Box 814, Indianapolis, Ind., apply for further particulars.

Improved Nail Extractor.

Boxes containing merchandise are often greatly injured, if not entirely destroyed, in opening, and the nails are either bent or broken so as to be unfit for further service. The little instrument herewith illustrated is a very convenient and efficient implement intended to save this destruction. It is a handle, A, of malleable iron pierced by two mortises containing the tongs, B, and the die, C, both of cast steel. The mortise through which B passes is much wider at the top than the bottom, and the tongs are secured by the pin, D, in combination with the walls of the mortise, from dropping entirely through. The inclines of the walls act as gripes, as the end of the handle is raised, to close the jaws of the tongs. The pin, E, passes through a slot in the die, C, to retain it in place.

HOGAN'S NAIL EXTRACTOR.

The operation can be easily comprehended. The jaws of the die, C, are placed over the head of a nail, and a sharp blow on the die indents the wood on each side the nail head. The tongs are then moved to the nail, and as the jaws drop into the indentations, the raising of the handle causes them to grip and draw the nail out without breaking or bending. The box or packing case is thus preserved for future use, and the nails are fit to be again employed. The advantages of using this simple and durable implement will be patent to all. It is an exceedingly neat and efficient tool.

These implements are made of two sizes, the larger for shipwrights and bridge builders, and the smaller for merchants and common use. This is only thirteen inches long and weighs one and a-quarter lbs. Patented May 29, 1866, by John H. Hogan, who may be addressed for further particulars at East Saginaw, Mich.

SHODDY---ITS MATERIAL AND MANUFACTURE.

The term "shoddy" is of recent date, at least in this country, and by means of a popular prejudice, has become a term of reproach to a certain class. At the beginning of the war it was found difficult to procure clothing for the large army, drawn, by the necessities of the country, from the avocations of civilians to the duties of the camp; and the necessities of the Government and the needs of our soldiers demanded a ready means of clothing thousands. The adaptability of shoddy suggested the idea that the refuse of woolen rags might be utilized as a component of cloth, while we were contracted in the procurement of raw wool.

The manufacture of shoddy in this country to an extent calculated to attract the attention of the public, dated from the commencement of the war. Some years before it had been noticed as being a necessary ingredient in the substance of table and piano covers, which showed a wool pile in raised figures, resembling the products of silk manufactured into velvet. This use of the material as a portion of the "filling" of woolen woven fabrics was perfectly legitimate, and is as popular now as ever. But it has been for some years used as a part of the fabric itself, and is carded and spun as a portion of the cloth with long stapled wool.

Shoddy is the wool of worn rags, clothing, carpets, etc., which have served their day in their primitive form and are put to baser uses, or compelled to serve a second probation in the same line. The rags are assorted as to color and quality, and are then fed into a machine similar to a carding machine for ordinary wool or cotton, except it is much stronger than these. The machine is a cylinder of iron, three, or three and a-half feet diameter, and twenty inches across the face. On the periphery lags of hard wood are fastened, filled with pins forged from steel one-eighth of an inch square, which project above the surface about two inches. These pins are driven through the wood in holes drilled to the size they are when forged (for every pin is forged to a point from the square steel), and the bases rest upon the face of the cylinder. The armed lags are then secured to the cylinder and faced to an even surface.

This cylinder revolves with great rapidity, while the rags are fed into its surface by means of fluted steel rollers. The teeth tear the rags to pieces and the wool comes out in a lint-like, disintegrated mass. This shoddy is really a very short stapled wool. The wear and weakening by dirt and dust, to which the rags in their previous condition of cloth have been subjected, tend, of course, to injure the quality of this short stapled wool. But where shoddy is made of knit articles, composed of Berlin or zephyr worsted, which is wool of very long fiber, it requires the experience of an expert to distinguish it from true wool. This quality can be used in the fabrication of cloth of good grade.

The shoddy for cloth is mixed by carding with unmanufactured wool, and spun into thread to be used for "filling," as it lacks the tenacity necessary for the "warp." Its principal advantage is to give "body" to the cloth. Usually not more than thirty-three per cent of shoddy is employed, as a larger proportion would injure the cohesiveness of the fabric. In the manufacture of wool hats it is sometimes used, but not extensively. It furnishes the beautiful pile on the elegant house paper known as velvet hangings, and as a felt, locally applied to prevent the radiation of heat, is coming extensively into use. Its manufacture has given a value to woolen rags, before considered worthless except as a fertilizer, and provided employment for thousands. Like many other valuable articles, its advantages have been abused.

The Onondaga Salt Works.

From the report for 1865 of the superintendent of these works, Mr. George Geddes, and a note accompanying it, we find that during that year the production of salt from the springs was 2,928,187 bushels. From 1797, the date of opening the spring, to the present time, the product was 168,698,569 bushels. The largest amount was reached in 1862, when 9,053,874 bushels were manufactured. It requires the evaporation of 38·4 gallons of water to manufacture one bushel of salt of 56 pounds. A singular statement in the report is that the conduits for conveying the salt water from the wells to the different manufactories are greatly clogged by a sediment deposited by the water, which sediment is composed principally of oxide of iron. The conduits or pipes are of logs, bored and strengthened at some points with iron bands. Between thirty and forty miles of these pipes are in use at the works.

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THE FINAL FATE OF THE UNIVERSE.

If two bodies were placed in space without any force acting upon either of them other than their own gravity, they would immediately start toward each other, and would rush together. The sun and planets which constitute the stellar system, to which our solar system belongs, are prevented from rushing together into one mass by their revolutions about each other. The revolutions of the planets around our sun, and of the satellites about their primaries, have been ascertained, with that wonderful precision which is the just pride of astronomical science, and astronomers are now engaged in the sublime problem of unraveling the revolutions of the countless suns that make up our stellar system. Already the cluster of the Pleiades is indicated as the proximate locality of the center around which our sun, with his attendant planets, is sweeping his vast orbit; and it is suggested that this is probably the common center of the orbits of all the suns of our stellar system.

If the force of gravity extends across the inconceivable spaces which separate the several stellar systems of the universe, these systems must rush together unless they are held apart by revolutions around each other.

If light were an emanation, as held by Newton, the spaces between the solid bodies of the universe might be absolutely empty; and, in that case, the revolutions of the bodies around each other might go on for ever. On the other hand, if light is a vibration in a subtle fluid, this fluid must obstruct the motions of bodies revolving in it, and they must finally come together in one mass. The experiment, so ingeniously devised by Arago, and carried out with such honorable regard for the fame of its designer, by Messrs. Foucault, Fizeau, and Breguet, to determine whether there is a difference in the velocity of light in its passage through air and through water, has demonstrated that light is a vibration. It follows from this that, as far as light extends, space is filled with a material fluid which resists the motion of bodies revolving in it, and bodies within this space must gradually wind their way inward, and ultimately come together into one mass.

The moon must be drawing very slowly nearer and nearer to the earth, and the two bodies, in the far distant future, will come together. The solid crust of the earth will be broken up by the shock, an immense quantity of heat will be generated by the destruction of the moon's motion, and the two bodies will fuse together into one molten globe. As the new and enlarged earth is cooled upon its surface, a second series of geological deposits will be constituted, accompanied, perhaps, by strange and inconceivable forms of animal and vegetable life.

At the same time, the earth is winding its way inward toward the sun, and must ultimately fall, an inconsiderable pebble, into that vast glowing mass. The same fate awaits all the planets, and our solar system must one day be but a single globe. When this globe is cooled to the right temperature, it may be covered with a multitude of inhabitants, and astronomers may arise who will watch its revolutions among the associated suns of our stellar system. If their knowledge and intellect are equal to the science of our astronomers, they will foresee the ultimate coming together of all these suns into one common globe. And not this only, for they will predict the final coming together of all the stellar systems of the visible universe into one mass of matter.

When this mass is first collected it will be intensely hot from the destruction of motion in the several suns and systems of suns as they come together. The heat will be radiated outward into the universe, and the one mass of matter will be gradually cooled. During the cooling there will be the same play and mutual interchange of heat, light, electricity, magnetism and other imponderable forces that there is now upon this earth. As the cooling proceeds the action of these forces will diminish; when 977 deg. is reached, light will cease, and darkness will fill the universe. As each vibration of heat leaves the surface of the material mass, it will expand outward at the rate of 192,000 miles per second in all directions, in the form of a swiftly-swelling hollow globe. When the temperature of absolute cold is reached (—493·2 deg.), the last vibration of heat will leave the mass of matter and will expand outward through infinity of space and time.

Supposing, however, the ethereal fluid which fills the visible portion of the universe is limited in extent, so that the last vibration of heat will reach its boundaries, and cease, what then becomes of the force of the universe, and of the doctrine of the conservation of force?

A WORD TO INVENTORS AND PATENTEES.

Too many of our inventors seem to suppose their work done and fortunes made as soon as they have filed a caveat or procured Letters Patent, which they seem to believe make their improvements visible and known to the world. A patent is simply a weapon of defense in the hand of the inventor against interlopers and meddlers, and not, as its name imports, a publication of the invention. If a thing is worth patenting it is because it can be made a source of profit to the owner, as well as useful to the world. To shut it up and preserve it carefully from prying eyes, nullifies the object of the patent. To be made profitable it must be made known, must be published and advertised. An advertisement, judiciously worded, and discreetly located in a journal which will reach the class for whose benefit the improvement is projected, is a wise and simple means of making it profitable; but every man prefers to see the article itself, or in lieu thereof, a correct representation of it.

For this reason it is of great importance to publish an engraving, with a description, of an improvement. We are in almost daily receipt of letters from inventors and proprietors of patents which demonstrate the advantage of this course. A good engraving, exhibiting the form, structure, and operation of a machine or implement, is an image that becomes fixed in the mind and when required is easily recalled; whereas words alone, being common to all subjects, lose their force when intended to designate or describe a particular object. Without being justly charged with egotism or vanity, we can affirm that the engravings of inventions published in our columns are not surpassed, if equalled, by those of any other publication, and we endeavor to make our descriptions terse, concise, and easily comprehended.

But whether this or another medium is selected for the purpose, we deem it a duty to inventors to direct their attention to the importance of illustrating their improvements, as a means of attracting the attention and interesting the minds of the public in the consideration of their advantages. The money thus spent is well invested, and the blocks can be used by the inventor—whose property they are—to reproduce indefinitely the cuts for circulars, handbills, bill heads, etc.

THE ANGLO-FRENCH CHANNEL TUNNEL.

A Mr. Hawkshaw has been engaged for several months in making surveys and calculations with reference to a submarine tunnel under the Straits of Dover, in the English Channel, to connect the two countries, France and England. He proposes to sink a shaft on either shore and run adits toward the middle, where he will construct an island, as a half-way station, and erect a lighthouse upon it. The road will be on an ascending grade from each shore to this central station. It is intended that the tunnel shall be used for steam trains exclusively. Mr. Hawkshaw is certain that the excavations, at the points he intends to run his tunnel, will be in a bed of clay, easily worked and affording a good matrix for the structure. He is in receipt of all sorts of advice from all sorts of people. One of the latest of these suggestions is to sink an iron tube suspended by floats or buoys!

There can be but little doubt of the practicability of the tunnel, but it will be a work of many years and extreme cost, and in case of war between the two nations—a not improbable event—would undoubtedly be greatly injured if not permanently destroyed. It is well enough that engineers should keep in the van of progress, but, from this and kindred projects, we are inclined to believe that some of them aim more at notoriety than a desire for usefulness. The Mount Cenis, Hoosac, and Chicago tunnels are neither of them works of such magnitude as this proposed bore, yet, except the last, it is doubtful if either of them will ever prove profitable, or repay the toil and money expended. The Thames tunnel, once considered one of the world's wonders, is practically valueless. Few care to pass through it except from motives of curiosity, similar to those which induce people to visit deep mines or walk under Niagara. Notwithstanding the traditional inconveniences and annoyances of the Channel passage, which is no worse than doubling Point Judith, and not half so bad as crossing the Bay of Fundy, it is doubtful, if this tunnel should be completed, whether people would prefer it to a trip across in a steamer.

Such a work, however firmly built, could not be insured as permanent and safe, and those who have traveled on railroads which have tunnels of only a mile or less in length, and remember what a sense of relief from anxiety they experienced when emerging into God's pure air and light, will not be pleased at the idea of traversing a tunnel of twenty odd miles under the bed of the sea. Mr. Hawkshaw will do better to turn his attention to more feasible and profitable projects, and employ his talents on works which will bring success rather than notoriety.

If railway connection between England and France is desirable, it can be much more easily accomplished than by a tunnel under the bed of the English Channel. A ferry boat of sufficient size, like that in use over the Susquehanna at Havre de Grace, could receive a whole train, locomotive and carriages, and land it on the opposite shore. The dimensions of the boat would be sufficient to insure a comparatively steady motion, free from the pitching and tossing to which the contemptible little tugs now used for the Channel passage are subjected.

ACTION OF LIGHT ON GLASS.—A curious fact is recorded in the *Photographic News*, showing the action of light on glass. A manufacturer of mirrors placed one on exhibition on which was his name in gilded letters. Retiring from business, all attempts to perfectly remove the letters proved fruitless; even grinding and re-polishing failed to obliterate all traces. The only explanation for this is found in the change which the unprotected portion of the glass underwent during long exposure.

COUNCIL BLUFF and Chicago will be united by rail by the first of March next.

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The Wood and Mann Portable Engine.

Probably no manufacturers of portable engines are more favorably known than Messrs. Wood & Mann, of Utica, N. Y. They have a large establishment in that city, devoted exclusively, we believe, to the making of portable engines of all descriptions, with power from that of three horses to thirty. In a visit to the establishment in February, 1865, we were greatly interested in observing the exactness and clock-like regularity of every process of the manufacture. Every piece of an engine is duplicated, and every part of the work is conscientiously performed, and all the mate ial used in the establishment is critically selected. Their engines are rated much below their actual capacity; with generous fire surface and ample steam room, their engines stand unsurpassed if not unrivaled, by those of other builders. We feel gratified to have an opportunity to recommend a firm who think more of a popularity and esteem gained by honest endeavor to excel, than of achieving a present profit at the expense of honor. We commend the attention of our readers to the advertisement of this old-established firm in our columns.

MR. JOHN EDYE has calculated that a ship of 120 guns, length 206 feet, breadth 54 feet, 6 inches, and depth 23 feet, of 2605 tuns burthen, will be 5⅞ inches deeper in river water than in sea water, this being owing to the difference of the specific gravity of fresh and salt water. This difference is equal to 143 tuns, 4 cwt., and it takes 24 tuns to immerse the ship 1 inch deeper.

PATENT OFFICE.

PATENTS GRANTED FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *twenty years*. Statistics show that nearly ONE-HALF of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after so many years' experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office.

Judge Mason, formerly Commissioner of Patents, says, in a letter addressed to us:—"In all your intercourse with the Office, I always observed a marked degree of promptness, *skill*, and fidelity to the interests of your clients."

Ex-Commissioner Holt says:—"Your business was *very large*, and you sustained and justly deserved the reputation of *marked ability* and *uncompromising fidelity* to the interests of your clients."

Ex-Commissioner Bishop says:—"I have ever found you faithful and devoted to the interests of your clients, as well as *eminently qualified* to perform the duties of Patent Attorneys."

EXAMINATIONS.—If an Inventor wishes our opinion in regard to the probable novelty of his invention, he has only to send us a pencil or pen-and-ink sketch of it, together with a description of its operation. For an Opinion, without examination at the Patent Office, we make no charge, but if a

PRELIMINARY EXAMINATION AT THE PATENT OFFICE

is desired, we charge the small fee of $5. This examination involves a personal search at the Patent Office of all models belonging to the class, and will generally determine the question of novelty in advance of an application for a patent. Up to this time we have conducted over TWELVE THOUSAND Preliminary Examinations, thus showing a more intimate knowledge of inventions at the Patent Office than can be possessed by any other person or firm.

If an inventor decides to apply for a patent, he should proceed at once to send us, by express (charges prepaid) a model not over one foot in size, and substantially made. He should also attach his name and residence to the model.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes Canadians have to pay $500.

FOREIGN PATENTS.—Messrs. MUNN & CO. have had more experience than any other solicitors in this country in procuring foreign patents, and have old-established agencies in London, Paris, Brussels, Berlin, Vienna, and other large cities. Foreign business should never be intrusted to other than experienced agents.

If an inventor wishes to apply for a patent, all he has to do is to write to us freely for advice and instruction, and he will receive prompt attention. If his invention contains any patentable features, he can depend upon getting his Letters Patent. All communications considered confidential. Send models and fees

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FOR THE WEEK ENDING SEPT. 11, 1866.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

57,838.—HULLING RICE, ETC.—William G. Adams, Boston, Mass.

I claim the process of treating grain, seeds, etc., with reference to the removal of the husks or coverings therefrom, substantially as set forth.

57,839.—SELF-OPERATING FLOOD GATES.—William H. Allard and Robert W. Thomas, Portage, Wis.

We claim the gate, B, pivoted eccentrically and arranged to operate in combination with the guards or breasts, C, substantially as and for the purpose set forth.

57,840.—PISTON FOR DEEP WELL PUMPS.—R. N. Allen, Cleveland, Ohio.

I claim the piston of an oil pump when constructed with two chambers separated by the valve check, b'', and a loose flexible packing, I, attached only at the upper and lower ends, with exterior spaces, B', for the passage of the oil around the valve chuck between the metallic cylinder and the packing, substantially in the manner and for the purpose set forth.

57,841.—CULTIVATOR.—W. J. Andrews, Columbia, Tenn.

First, I claim the harrows, g, and scrapers, N, attached to adjustable frames, L, applied to the front part of the framing, A, in connection with the reciprocating thinning hoe, I, all arranged and applied to a mounted frame in the manner substantially as and for the purpose set forth.

Second, The gage, K, applied to the draught pole, J, in combination with the lever, O, attached to the rear end of the framing and connected with the rear end of the draught pole, substantially as and for the purpose specified.

57,842.—WHEAT DRILL.—A. Armstrong, Gillespie, Ill.

I claim, First, The lever, P R, together with the post or standard, Q, in combination with the pole, S, for the purpose of raising the runners from the ground, all for the purpose and substantially as described.

Second, I claim the cams, c and c' in combination with the levers, G and G', slides, F and H, the cams, C, lever, D, having a continuous alternate motion, and the cams, C, and lever, G', having an intermittent motion, all for the purpose and substantially as set forth.

57,843.—STRIKING WORKS FOR CLOCKS.—Benjamin Bacon, Morrison, Ill.

I claim, in combination with the count wheel and cam of a clock, a slide, S, provided with pins, a b, or their equivalent, arranged and operating substantially as and for the purposes herein specified.

57,844.—WHIFFLETREE.—F. A. Balch, Hingham, Wis.

I claim the combination of the bar. A, with the bars, C and D, and springs, E and F, substantially as described and for the purpose set forth.

57,845.—WEATHER STRIP.—Robert Bartley, Norwalk, Ohio.

I claim the roller, E, in combination with the slide, m, shaft, l, spring, O, and post, p, for the purpose of rendering the space between the bottom of doors or windows and thresholds or window sills air-tight, and at the same time of rendering the roller capable of passing over carpets or floors without hindrance or wear, substantially as described.

57,846.—GUN BARREL.—A. L. Bausman, Minneapolis, Minn.

I claim, the rod, A, or its equivalent having a slotted and notched sleeve, c, hung upon pins or studs of its lower end, and a spindle, I, capped at its end in combination with the spring or scraper arms, D, when the several parts are arranged and connected together substantially in the manner and for the purpose described.

57,847.—SNAP HOOK.—Fordyce Beals, New Haven, Ct.

I claim the hook, A, pivoted to the shank of the eye, B, and arranged so as to operate substantially in the manner and for the purpose herein set forth.

57,848.—REGISTER FOR REGULATING TIME-KEEPERS.—William M. Beeman, Hartford, Ct.

I claim the registers, B b, and C c, in connection with the regulator, A a, substantially as and for the purpose herein specified.

57,849.—COMPOSITION FOR PRINTERS' ROLLERS.—Leander K. Bingham, New York City. Antedated Sept. 5, 1866.

First, I claim a compound of glue, molasses or other saccharine matter and alum or other equivalent material, substantially as and for the purpose described.

Second, Also a compound of glue, molasses or other sacharine matter and nitric acid or other equivalent material, substantially as and for the purpose set forth.

Third, Also a compound of glue, molasses or other saccharine matter, alum or other equivalent material, and nitric and other equivalent material, substantially as and for the purposes specified.

57,850.—HOISTING APPARATUS.—Henry Black, Carrollton, Ill.

First, I claim the combination of the carriage, D, having the wheels, C C, arranged to travel upon the rod or track, B, and the automatic pawl, I, and automatic brake, G, or their equivalents, when used as and for the purpose set forth.

Second, I claim the construction of the brake, G, in an adjustable manner, so it may be set to any required distance from the sheave, E.

57,851.—HARROW.—Everal Bradley, Clyde, N. Y.

I claim the combination with the triangular central harrow, A, of parallel wings, B B, converging forward in the direction of motion, the connection of said parts being made by the hinges, g h, in such a manner that the wings can be detached at any time, or turned up over the center to weight the same, the whole arranged and operating as and for the purpose herein specified.

57,852.—DAM AND LEVEE.—Benjamin Britten Galena, Ill.

First, I claim the improved mode of constructing dams and levees, substantially as herein described and set forth.

Second, The combination and arrangement of the timbers, A, planks, C, and clay, B, or equivalent, in the construction of dams and levees, substantially as herein described and for the purposes set forth.

57,853.—SHEEP AND CATTLE RACK.—J. B. Brown, Medina, Wis.

I claim the combination of the pivoted or hinged boards, D D, hinged division strips, C C, troughs, B B, and frame, A, all constructed, arranged and operating substantially as herein shown and described.

57,854.—THILL COUPLING.—James J. Brown, Madison, Wis.

First, I claim the thill iron, D, having its rear end divided and provided with the checks, E, one or both which are provided with a notch, m, for the button to move on, as and for the purpose set forth.

Second, I claim forming the cavity for the reception of bolt, o, and its packing e, by means of the bar, B, having its front end bent as shown, and the front leg of the clip, C, as herein shown and described.

Third, The button, A, pivoted to the clip, C, in combination with the check, F, provided with the notch, n, arranged to operate as and for the purpose set forth.

Fourth, I also claim securing the button, A', by means of the stem, b, and nut, c, when used in connection with the packing, e, surrounding the bolt, o, as shown, for the purpose of tightening up the packing as shown in Fig. 4.

57,855.—METALLIC HUB.—Henry B. Buch, Litiz, Pa.

I claim a metallic hub formed by the union of the pipe-box, C, with its flanged and prolonged screw pipe, D, together with the flanged nut, E e, cap, F f, all held on the pipe box, in combination with the annular disks, G G' headed bolts, H, and their nuts, h, all combined and arranged in the manner, and for the purpose specified.

57,856.—CULTIVATOR.—M. H. Bucknall, Darien. Wis.

First, I claim the lever frames, B B, attached at their front ends by joints, a a, to the front end of the frame, A, in combination with the segment guides, C C, and the stop pins, d, or their equivalents, substantially as and for the purpose herein set forth.

Second, The combination of the teeth, J, standards, I, rivets o, shoulders, k, screw nut, l, braces, m, and frame, A, substantially as described for the purpose specified.

57,857.—LOCK.—R. B. Burchell, Brooklyn, N. Y.

I claim the reversible tumblers set and turning upon a stud that is upon the central line or plane of the bolt and key stud, the ends of said tumblers projecting beyond and entering notches at the inner side of the bolt head when the bolt is retracted, substantially as set forth.

57,858.—CULTIVATOR.—John Burnham and William C. Lathrop, La Salle, Ill.

First, We claim the attaching of the plow frames, G, to an upright mounted frame, A, by means of joints, d, and bars, F, arranged as shown, to form a universal joint connection to admit of the vertical and lateral movement of the plows, substantially as described.

Second, We also claim the connecting of the two plow frames, G G, by means of a yoke H*, having its ends pivoted to bars, I* I*, which are secured horizontally on the frames, G G, by pivots, e, to admit of the frames, G, rising and falling independently of each other, as set forth.

Third, We also claim the duplex double tree arrangement composed of the two double trees, D E, attached to the draught pole, C, and connected by the rods, a, substantially as described.

57,859.—DREDGING MACHINE.—Thomas Byrne, New York City.

I claim the obtaining of power for the purpose of dredging or excavating channels or sand bars by means of water gates or wings attached to steam or other vessels, as herein described.

57,860.—ATTACHING ROOFING TO BUILDINGS.—Thomas Y. Card, Cortland, N. Y.

I claim the hereinbefore-described process of constructing and covering the roof of buildings in the manner and with ingredients compounded, substantially as set forth.

57,861.—MUSICAL INSTRUMENT.—R. W. Carpenter, Brattleboro, Vt. Antedated Sept. 2, 1866.

I claim the double-jointed pedal susceptible of a double or duplex movement in combination with the lever, e, substantially as described.

57,862.—MACHINE FOR SOWING WHEAT AND OTHER GRAIN.—Cyrus C. Carter, Exeter, Ill.

First, I claim the shaft, Q, with the lever, R, attached, in combination with the springs, P, and runners or furrow openers, O, all arranged to operate substantially as and for the purpose set forth.

Second, The sliding or adjustable inclined board, K, with the seed-conveying tubes, M, attached, and arranged in relation with the seed box, E, substantially as and for the purpose specified.

Third, The pendants or agitators, J, attached to the rock shaft, I, operated from one of the wheels, C, as shown, in combination with the perforated bottom, a, of the seed box, E, and the perforated slides, c G, substantially as and for the purpose set forth.

57,863.—BARREL OR CASK.—Chas. H. Carver, Taunton, Mass.

I claim the combination as well as the arrangement of the screw or faucet receiving block, C, with the metallic vessel, B, or the same and the barrel encompassing such vessel.

I also claim the combination as well as the arrangement of the rubber washers, or their equivalents, and the metallic washer with the block, C, and the vessel, B, or the same and the barrel, A, the said washers being to form with the head of the vessel, B, and with a faucet, as described, a tight joint at the ajutage of the vessel, B.

I also claim the improved manufacture of barrels as made of the wooden barrel, A, and the lining vessel, B, made of tinned or plate iron, as specified, arranged together as set forth.

57,864.—REVOLVING FIRE-ARM.—Albert Christ, California, Ohio.

First, I claim the combination of the two circles of cartridge chamber, I, two feed fingers, N N', and single hammer, M, constructed, arranged, and operating as and for the purposes set forth.

Second, Propelling a revolving breech by means of one or more fingers, N, adapted to operate on the heads of the metallic cartridges, in the manner explained.

57,865.—KNIFE CLEANER.—Wm. Christian and J. H. Marrow, New York City.

First, We claim the employment, in connection with the box, of the two yielding boards, D and E, the upper board, D, having formed in it the supply hopper, H, and the whole arranged to operate substantially as set forth.

Second, The employment, in combination with the cleaning mechanism, of a waste drawer, B, and fork platform or rest, f, the whole arranged to operate substantially as set forth.

Third, The employment, in connection with the case, of holding devices, I K, as specified for the purpose set forth.

57,866.—LAMP FOR PETROLEUM.—M. C. C. Church, Parkersburgh, West Va., and Edward H. Knight, Washington, D. C.

We claim a tank for the transportation or storage of petroleum or other liquids, provided with an auxiliary chamber and connecting pipe, operating substantially as described.

57,867.—WHIFFLETREE.—Frank Clemens, Lafayette, Ind.

I claim the crank shaft, C, springs, G G, and pins, F F, in combination with straps, I I, and whiffletree, B, for the purposes and substantially as described.

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57,868.—HAND CORN PLANTER.—Rienzi L. Cleveland, Durand, Ill.

First, I claim the combination of the lid, L, with the box, A, and brush head, N, substantially as set forth.

Second, The slide, o, in combination with the chamber, D, and stationary bottom, C, and brush, G, as and for the purpose set forth.

57,869.—APPARATUS FOR STRIPPING FILES.—T. Coldwell, Matteawan, N. Y.

First, I claim the reciprocating, sliding, stripping tool, I, arranged and operating with holders, N2, substantially as described for the purpose specified.

Second, In combination with the above, I also claim the frame or guide way, H H, for the stripping tool, hung so as to allow the said tool to be lifted from the file blank or blanks upon which it is operated without arresting its movement, substantially as and for the purpose specified.

Third, The holders, N2, for the file blanks, having sliding adjustable clutches, K, at each end, for securing the blanks in place for the same, substantially as and for the purposes specified.

Fourth, Swiveling the blank holders, N2, to the frame, M, supported upon spiral springs, N, or their equivalents, at each end, as and for the purpose described.

57,870.—COMPOUND PROJECTILE.—John E. Crane and Jesse Fox, Lowell, Mass. Antedated Sept. 5, 1866.

We claim constructing shells and shot, for ordnance, substantially in the manner and upon the principle herein set forth, for the purpose of increasing the fragments from shells, and avoiding the shrink at the center of shot, as specified.

57,871.—GARDEN PLOW.—John M. Crawford, New Castle, Ky.

I claim the garden plow or cultivator, consisting of the slotted beam, A B H I, fore and hind wheels, J and K, fastening, G or F, scrapers, L M, garding and propelling handle, N, and interchangeable shares or cultivating instruments, substantially as set forth.

57,872.—FENCE.—Samuel Crocker, Oakland, Iowa.

First, I claim the combination and arrangement of the stakes or braces, C, and binding bar, D, with the overlapped ends of the adjacent panels, A and B, substantially as herein described and for the purpose set forth.

Second, Securing the ends of the adjacent panels, B and E, at the corner or angle of the fence to each other by combining the projecting ends of the boards, b', of the panel, B, the end uprights, e', of the panel, E, and the keys or wedges, F, with each other, substantially as herein described and for the purpose set forth.

57,873.—MACHINE FOR POINTING WIRES.—C. O. Crosby, New Haven, Conn.

I claim a device for holding and rotating the wire, rod, or similar article, in combination with compressing dies or hammers, when the holding device is constructed to operate so as to avoid injury to the said wire, rod, or article being drawn by twisting, substantially as herein set forth.

57,874.—COMPOSITION FOR ROOFING.—Cary K. and S. F. Daniel, Covington, Ky.

We claim the composition, herein described, composed and compounded, as described for the purposes stated.

57,875.—SPRING BED BOTTOM.—John and Samuel Danner, Canton, Ohio.

We claim supporting the longitudinal slats upon spring bearers or cross pieces, and holding them thereto so that they may move endwise thereon by means of the staples, long slots, and cord or twine, or their substantial equivalents, as herein described and represented.

57,876.—CLUTCH HOOK FOR SLAUGHTERING PURPOSES.—Samuel Davis and Windsor Leland, Chicago, Ill.

First, We claim the combination of the hooks, A and C, provided with the eyes or rings, a c, respectively, and the chain, B, operating substantially as specified and for the purposes set forth.

Second, We claim the combination of the above-described device with an inclined rod or track, F, so arranged upon its supports as to allow the hook, A, to slide upon the same, substantially as and for the purposes described.

Third, We claim the combination and arrangement of the catching device, A B C, the inclined rod, F, and hook and chain, H I, operating substantially as herein described and for the purposes specified.

57,877.—TACKLE FOR RAISING AND LOWERING BOATS.—William A. Devon, Port Richmond, N. Y.

I claim the method herein described of raising and lowering ship's boats, by running the ropes of the end tackle through a block connected with an intermediate or center davit, and afterward giving the loose ends or portions of said ropes bite on or attaching them to a rotating barrel, substantially as specified.

57,878.—WHEEL PLOW.—O. P. Dills, Falmouth, Ky.

I claim the slotted adjustable bars, C F, with wheels, D E, attached and the brace rod, K, provided with the loop or eye, k, all arranged and applied to a plow, substantially in the manner as and for the purpose set forth.

57,879.—THROTTLE-VALVE LEVER.—Edson Doe, Newbury, Vt.

I claim the handle, D, formed with a threaded extremity and employed in connection with the throttle lever, substantially as and for the purpose herein specified.

57,880.—WICK BURNER FOR HEATING AND COOKING.—H. W. Dopp, Buffalo, N. Y.

First, I claim the application of a current of steam or water vapor, in combination with a wick burner, for burning any inflammable oil, for cooking and heating purposes, substantially in the manner herein described.

Second, I claim the mode of raising and lowering the wick, as described.

Third, I claim the employment of cylinder, M, in combination with a stove for cooking or heating purposes, and wick burner or burners, so constructed that the same shall serve to create a draft sufficient to supply the flame with atmosphere, and at the same time conduct the heat directly to the cooking utensils used, as set forth.

Fourth, I claim constructing the cylinder, M, so as to prevent the loss of heat by radiation, as shown in Fig. 2 and described.

Fifth, I claim the window, N, in combination with cylinder, M.

57,881.—MEANS FOR RAISING SUNKEN VESSELS.—Oliver Drouillard, Detroit, Mich.

First, I claim the central camel, A, Fig. 1, in combination with the lateral camels, A' A", Figs. 2 and 3, all constructed, arranged, and to operate in the mode and for the purposes above described and set forth.

Second, The air boxes, L L', Figs. 1 2 and 3, in combination with the central and lateral camels, all constructed, arranged, and to operate in the mode and for the purposes above described and set forth.

Third, The bridle, H, Figs. 1 4 and 5, having its attached chain stops, G" G"', constructed, arranged, and to operate in the mode and for the purposes above described and set forth.

Fourth, The bridle, H, having its attached chain stops, G" G"', in combination with the central camel, all constructed, arranged, and to operate in the mode and for the purposes above described and set forth.

Fifth, The bridle, H, having its attached chain stops, G" G"', in combination with the air boxes, L L', all constructed, arranged, and to operate in the mode and for the purposes above described and set forth.

57,882.—SIDE GEAR FOR THRASHING MACHINES, ETC.—Charles F. Du Vall, Milwaukee, Wis.

I claim bed plate, B, traversing plate, C, shafts, E and F, pillow block, D, and set screws, H H, or their equivalents, combined and arranged substantially as and for the purpose described.

57,883.—SUGAR-CANE MILL.—Alvah Eaton, Madison, Wis.

First, I claim the employment or use, in a cane-crushing mill, of a jointed frame or a frame hinged at one end, in connection with a roller having its bearings on arms one end of which rests on the frame, and all arranged in such a manner that the gravity of the mill is rendered subservient in assisting in giving the necessary pressure to the rollers, substantially as set forth.

Second, The rock shaft, J, provided with the arms, L L, or their equivalents, and the projections, m m, in connection with the links, n n, attached to the frame, substantially as and for the purpose specified.

Third, The adjustable boxes, G, in which the rollers, h, of the arms, E, are fitted, for the purpose of virtually lengthening and shortening said arms, as specified.

Fourth, The lips, k, at the outer surfaces of the side pieces, A A, in connection with the lips, l, at the upper ends of the uprights, I I, as and for the purpose set forth.

57,884.—MEDICAL COMPOUND.—Joel B. Edwards, Knightstown, Ind.

I claim the combination of the within named ingredients to form an antiseptic compound for the purpose described, substantially as set forth.

78,885.—FRUIT DRIER.—Wm. L. Fisher and Wm. Holly, Freeport, Ill.

First, We claim the double flue, H K, in combination with the furnace and with the drying chamber of a fruit drier, substantially as described and for the purpose set forth.

Second, The fruit tray, formed of lath, B, and canvas, C, in combination with the furnace and drying chamber of the fruit drier, substantially as described and for the purpose set forth.

57,886.—DEVICE FOR CARRYING HOSE.—Peter Frentz, New Albany, Ind.

I claim the pivoted handles, A A, with bands, B B, chains, D D, plate, E, and eccentric hook, H, arranged in the manner substantially as and for the purposes herein set forth.

57,887.—BOW PIN FOR OX YOKES.—E. G. Gale, Holland, Mich.

I claim securing the bows of an ox yoke in and to the yoke by means of toothed rack or ratchet bolts, in combination with toothed sectors engaged with such bolts, when arranged together and upon the yoke, substantially as described.

57,888.—CORN HUSKER.—James H. Gano, Tremont, Ohio.

I claim a corn husker having upon it the rings, a b, curved or swelled portion, c, and projection, d, and worn upon the fingers, as and for the purpose herein set forth.

57,889.—SULKY PLOW.—Roland R. Gaskill, Mendota, Ill.

First, I claim a sulky plow having the driver's seat, K, so attached as to permit it to oscillate freely horizontally, substantially as and for the purposes set forth.

Second, The hereinbefore described mechanism for adjustably suspending the plow, A, by a system of levers, C E and F, and a chain, F', said several parts being respectively constructed and the whole combined substantially as set forth.

57,890.—MANUFACTURE OF FUEL.—Samuel D. Gilson, Oswego Falls, N. Y.

I claim the new article of manufacture herein described, constituting fuel made from peat, or peat and other substances combined, in hollow or serrated triangular form, essentially as specified.

57,891.—YEAST-CAKE DRIER.—Cyrenius Gleason, Buffalo, N. Y.

First, I claim the lattice-work frame, when constructed as and for the purpose herein substantially set forth.

Second, In combination therewith, I claim the removable pieces marked B, as and for the purposes described.

57,892.—FURNACE FOR CALCINING GYPSUM.—Freeman Godfrey, Grand Rapids, Mich.

First, I claim, in an apparatus for calcining gypsum, one, two, or more rotary boilers, substantially as and for the purpose specified.

Second, I claim a distributor, B2, arranged and operating substantially as described.

Third, I claim a spiral conveyor, b', located within the heater, and operating substantially as described.

Fourth, I claim a cooler, G, constructed, arranged, and operating substantially as described.

Fifth, I claim the combination and arrangement of the fire arch, A, heaters B B', rings or collars, a, friction rollers, g, spiders, e, and driving shafts, D D, as and for the purpose specified.

57,893.—MACHINE FOR CUTTING STANDING CORN STALKS.—J. M. Goff, Ionia, Ill.

I claim the knife or cutter cylinder, B, connected to the draft pole, A, substantially as shown and described, in combination with the pivoted frame, C, provided with the wheels, D D, and with or without the hooks, G G, all being arranged to operate substantially as and for the purpose set forth.

57,894.—APPARATUS FOR MAKING VINEGAR.—Theodore Grundmann, St. Anthony, Minn.

I claim the arrangement of a series of troughs or channels, C C' C", etc., provided with covers, through which the liquid to be acidified, and also a sufficient quantity of air to produce acidification, is admitted, substantially as and for the purpose described.

57,895.—CARPET FASTENER.—Christopher Gullmann, Poughkeepsie, N. Y.

I claim holding the toothed rod, A, against the carpet and floor by means of the screw, v, having a curved neck, b, substantially as described for the purpose specified.

57,896.—MANUFACTURE OF SPECTACLE FRAMES.—Henry Hammond, Hartford, Conn.

First, I claim the method herein described and shown of forming spectacle fronts in one piece out of sheet metal.

Second, The stud, d, on the end, A, serving as a pivot for the temple, and through which the screw passes to fasten the ends, A, one to the other.

57,897.—PUMP.—A. S. Hanson, Milan, Mich.

I claim the combination with the main cylinder or stalk, A, of the pump, divided into two chambers, C and D, of the cylinders, E and L, respectively, having valves, F and G and M and N, and pistons, H and O, connected to a common handle, K, when all arranged together and operating substantially in the manner described and for the purpose specified.

58,898.—LOOM FOR WEAVING SLATTED WINDOW SHADES.—George Hasecoster, Richmond, Ind.

I claim the slat trough, 5, and slat rest, 6, in combination with the slat carrier, 1, all arranged and operating as and for the purposes set forth and described.

Second, The cord, 7, spring, 16, slide, 11, and top, 12, when so arranged and operating as to carry and deliver the slats within the shed, in combination with the slat carrier, 1, substantially as set forth.

Third, The combination of the pulley, 8, cord, 7, and sliding clutch, L', when operated as and for the purposes set forth.

Fourth, The shaft, i, pinion, E, drum, U, and arms, Z and R', arranged as and for the purposes set forth.

Fifth, The combination of the star wheel, T, levers, W W, connections, V V', and treadles, t t, as set forth and described.

Sixth, The shaft, d', and its curved bearings, d d d, constructed and operating as herein set forth and described.

Seventh, The combination of the batten, a a, reed, c, and shaft, d', with its curved bearings, d d d, when arranged and operating as and for the purposes set forth.

Eighth, The friction straps, l l, and slides, m m, in combination with the warp cylinder, R, as set forth and described.

Ninth, The combination of the arm, z, lever, Z, levers, P and P', and ratchet wheel, O, all arranged and operating as and for the purposes set forth.

57,899.—HAME TUG AND BUCKLE.—Lawrence W. Heeland, Petersburg, Ill.

First, I claim the tug, A, when constructed with the necking, a', hook, a, and mortise, a2 a3 and a4, substantially as described.

Second, I claim the buckle, C, and its spring, c3, when constructed and employed substantially as herein described and set forth.

Third, I claim the combination of the tug, A, and the buckle, C, for the purpose of attaching the trace of a harness to the hame thereof, substantially as herein described and set forth.

57,900.—COOLER FOR BEES, ETC.—John Herget, St. Louis, Mo.

First, I claim the combination and arrangement of the chambers, A B C, and the sub-vault, A2, substantially as herein described and set forth.

Second, I claim the basin, D, when constructed with a perforated bottom, and otherwise so arranged as to discharge its contents either in a shower of drops or a number of very small streams down into the cooling chamber, B.

Third, I claim the cooling tubes, B, when employed as herein described and set forth.

Fourth, I claim the construction and arrangement of the pipes, E and E', as herein described and set forth.

57,901.—PADDLE WHEEL.—Adolph Heuston, San Francisco, Cal.

What I claim as my invention is the combination of the paddle, A, the pivots, B" B", and hooks, C" C", with the stop, E, and lever, F, the regulator, I, all substantially as and for the purpose specified.

57,902.—SPRING DIRK KNIFE.—Charles Hibbard, Chicago, Ill.

First, I claim the catch bar, D D, having catches, c c', on its ends, in combination with the blade, B, and spiral spring, C, substantially as described.

Second, The pin, g, in combination with the blade, B, and spring, C, substantially as and for the purpose specified.

57,903.—MOLDER'S FLASK.—James G. Holliday, Wheeling, West Va.

First, I claim the combination with the frames, A A', of the metallic hooks, E e, when formed with the studs or projections, e', and employed in connection with the keys, F, and plates, G, to connect together the several parts of said frames, substantially as described.

Second, I claim coupling or connecting together the two parts of the flask, by means of the plates, H H and I, and tongue, J, when said plates, H H, and tongue, J, are provided with the studs or projections, h' j', and arranged to operate as described.

57,904.—GRAIN BINDER.—Solomon T. Holly, Rockport, Ill.

I claim the combination of the ring carrier with a frame composed of two metallic-ring frames, constructed and operating substantially as set forth.

I also claim the combination of a detachable holder for the compressing strap, with a revolving carrier, and with an instrument for operating the strap holder, so that the strap holder is operated to release the strap while it is carried by the revolving carrier, substantially as set forth.

I also claim the combination of one of the jaws of the forceps (for holding the binding material) with a slide, operating substantially as set forth.

I also claim the combination of the spool for the binding material with the driving shaft of the revolving carrier by means of a spring connection, operating substantially as set forth.

I also claim the combination of the spool of the binding material with an eye guide having the form of a coil.

I also claim the combination of the pulley guide of the binding material with a movable arm, and with a fastening therefor, operating substantially as set forth.

I also claim the combination of the pulley guide of the binding material with a curved tongue casing, operating substantially as set forth.

I also claim the combination of the movable driver for the binding material with a detachable fastening to hold the driver in position, for supporting the binding material, substantially as set forth.

I also claim the combination in a binder, of the following instrumentalities, viz: the revolving carrier and a band-securing instrument secured to it, so that the latter is caused to travel round the gavel, substantially as set forth.

I also claim the combination in a binder, of the following instrumentalities, viz: the traveling band-securing instrument, and movable shield plate, substantially as set forth.

I also claim the combination in a binder, of the following instrumentalities, viz: the traveling band-securing instrument, and a yielding pressure holder operating upon the extremities of the band, substantially as set forth.

I also claim the combination of the stock of the movable shield plate and guard (or of either of them) with the traveling band-securing instrument, by means of a locking mechanism, so that the stock and band-securing instrument are connected and moved together, substantially as set forth.

I also claim the combination of the traveling band-securing instrument with movable nippers, operating substantially as set forth, to hold the extremities of the band.

I also claim the construction of the tying bill with lips flaring at its hinder side, substantially as set forth.

I also claim the combination of the tying bill with two sets of actuating mechanism, the first to turn it forward and the second to turn it backward, substantially as set forth.

57,905.—POLE AND POST PULLER.—Ira Holmes, South New Berlin, N. Y.

I claim an improved self-adjusting pole and post puller, formed by combining the hook, C, constructed as described, with the lever, B, and standards, A, substantially as and for the purpose set forth.

57,906.—CULTIVATOR.—Henry Hoover, Hemlo, Ill.

First, I claim the arrangement and combination of the central beam, O, shovel standard, D', shovel, Q', with the central roller, F, and shaft, 5, when constructed substantially as and for the purpose specified.

Second, The segment guides, J, having the grooves, S, in combination with the inner beams, G, rollers and shovel standards, D", shovels, A", cams, L, and shaft, 5, substantially as described and set forth.

57,907.—FOUNDERS' CLEANSING MILL.—Stephen D. Horton, Peekskill, N. Y.

I claim an improved cleaning mill, the body of the staves of which are slotted with rectangular hopper-shaped slots or holes, substantially as described, and for the purpose set forth.

57,908.—MACHINE FOR MOLDING AND SHAPING DOUGH INTO LOAVES OR CRACKERS.—William Hotine, Brooklyn, N. Y.

First, I claim, in combination with a grooved cylinder and shell, the use of nipples or molding points of any suitable form, set in the grooves, for the purpose as described.

Second, I claim the combination of the roller, D, with the shell, E, made and arranged in the manner and for the purpose, as described.

Third, I claim, in combination with a grooved cylinder and shell, the use of the revolving cups, F F and H H, or their equivalents, for the purpose of placing and discharging the pellets, as described.

Fourth, I claim the use of flatting plates, G G, in combination with a molding apparatus, such as herein set forth, whereby the pellets are received direct from the molder, for the purpose as herein described.

Fifth, I claim, in combination with an apparatus for molding and shaping crackers, etc., the forked or serrated sliding bar, I, by which the cakes are brought up in an even line on the table, for the operation of the docker.

57,909.—PLOW.—Chester B. Hunting, Clinton, Ill.

A cutter in the form of a disk, and attached to a plow, so as to cut from bottom to top, for the purposes and substantially as herein described.

57,910.—FAUCET.—George R. Huntley, Taunton, Mass.

First, The screw clamp, E, and trunnions, F, in combination

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with the nozzle, D, for the purpose and substantially as described.

Second, The faucet, A, in combination with the adjustable nozzle, D, and screw clamp, E, all for the purpose and substantially as described.

57,911.—SPIKE DRAWER.—S. Hurt and J. Douglass, Prentice, Ill.

We claim constructing a claw bar or spike drawer of two parts connected together by a joint, in such manner that the implement may be used either in an extended position or with one part at an angle with the other, substantially as and for the purpose specified.

57,912.—SOUNDING BOARD FOR PIANO.—A. De Kuhn, New York City.

I claim a sounding board, made in box form, detached from the sides of the case, substantially as described and for the purpose set forth.

57,913.—CHURN.—B. Illingworth, Freeport, Ill.

I claim the arms, B B, provided with the buckets, D D, constructed as described, upon the shaft, C, when arranged within the churn, B or A, and operating in the manner substantially as and for the purposes specified.

57,914.—LANTERN.—John H. Irwin, Chicago, Ill.

I claim hinging the guard of a lantern to the bottom casing thereof, and securing the parts together opposite the hinge by means of a catch, or its equivalent, substantially as herein specified and shown.

57,915.—RETORT FOR GENERATING GAS.—John H. Irwin, Chicago, Ill.

First, I claim providing a retort for generating gas and refining petroleum, arranged as described, with an air vent or tube, substantially as and for the purposes specified,

Second, In combination with a retort of the described arrangement and construction, I claim the employment of a reservoir, A, and connecting pipe, a, arranged and operating as and for the purpose described.

Third, I claim the combination and arrangement of the reservoir, A, connecting pipe, a, retort, B, provided with an air vent, as described, pipe, c, and receiver, E, substantially as and for the purposes set forth.

Fourth, In combination with a retort, B, I claim the employment of the auxiliary vapor pipe and burners, d, arranged and operating substantially as shown and described.

57,916.—PISTON PACKING.—A. W. Jackson, Centralia, Ill.

I claim the combination and arrangement of the perforated plate, C, perforated plate, B, having projections, b', valve ring, E, grooved ring, F, ring, G, and projecting plate, H, constructed and operating substantially as and for the purpose set forth.

57,917.—BELT GUIDE.—Lewis R. Jenkins, Philadelphia, Pa.

I claim the adjustable hangers, A and A', with their adjustable frames, B and B', and pulleys, C C', the whole being constructed and arranged substantially as described for the purpose specified.

57,918.—COMBINED KNIFE AND FORK.—John S. Jennings, Buffalo, N. Y.

First, I claim a combined one-handed knife and fork, consisting of the blade, H, pivoted to the sleeve, F, with spring, o, or its equivalent, and finger lever, I k, in combination with a fork, operating substantially as set forth.

Second, I also claim, in combination with the above-described parts, the thumb bearing or socket, L, operating in the manner and for the purposes described.

57,919.—BRICK MACHINE.—John Jones, Baltimore, Md.

First, I claim the combination of the shoulder, P, and large teeth, Q, to overcome the inertia, and the small teeth, R, and the entire arrangement by which the bed-plate, J, receives its alternate motion.

Second, The vertical slides, U and f, in connection with the movable bottom of the molds, whether the slides are acted on by cam, eccentric, or lever, for the purpose of giving a perpendicular pressure to the brick, or raising the bricks when pressed perfectly perpendicular from the mold.

Third, The entire arrangement, as described, in the specifications for clearing bricks to the off-borer, and also for the oiling apparatus.

Fourth, The arrangement by which the off-bearer receives its alternate motion and communicates the same to the bricks, as described.

Fifth, The application of this machine for pressing clay, peat, or any other substance capable of being molded under pressure.

57,920.—VALVE FOR WATER PIPES.—William Kearney, Belleville, N. J.

I claim the combination and arrangement of the valve, C, box, A, flanges, B B, cock, b, screw, D, worm wheel, and screw I, all arranged to operate substantially in the manner as and for the purpose specified.

57,921.—SCALE BEAM.—Joel F. Keeler, Pittsburgh, Pa.

I claim constructing scale beams and their appendages so as to show both the larger and the smaller denominations of the net and of the tare weighed, substantially as described.

Second, I claim constructing scale beams so that two or more poises may be made to pass each other along the same beam usually its entire length, substantially in the manner described.

Third, I claim dividing the counter weight holder, d', into sections, when two or more of said sections are marked or figured, substantially as described and for the purposes set forth.

57,922.—WASHING MACHINE.—G. H. Kidney, Cleveland, Ohio.

I claim the adjustable racks, H I, button, b, in combination with the pressure boards, F, springs, K, and beaters, as and for the purpose specified.

57,923.—EVAPORATOR.—David Kinzer, Sardinia, Ohio.

First, I claim the marginal ledge, C D, formed upon or adapted to be attached to the common hemispherical boiling kettle.

Second, The kettle, A B C D, or its equivalent, as a new article of manufacture.

57,924.—BEE HIVE.—E. N. Kingsley, Minneapolis, Minn.

First, I claim the case, A, constructed with doors or slides, E E, notched at their lower edges, and having notched slides, F, in front of them, for the purpose of closing the bee entrances or wholly or partially opening them, as may be desired.

Second, The passage, a, in the rear of the case between its wall and the frames, opening into the excavation, D, for running off the moisture from the boxes and supplying warm air to the case, substantially as described for the purpose specified.

Third, The securing and arranging of the top and bottoms, h, in the boxes or sections, H, so that a space will be allowed all around them for ventilation and the evaporation of moisture, substantially as described.

57,925.—METHOD OF STARTING STREET CARS.—T. F. Kums and W. W. Benson, Rockford, Ill.

First, We claim the combination and arrangement of lever, D, crank, E, thrust bar, F, pawl, I, ratchet, H, and tie piece, J, or their equivalents, operating substantially as described and for the purpose set forth.

Second, The combination and arrangement of the lever, D, with spring, K, and stud, X, or their equivalents, substantially as described.

57,926.—HEAD REST FOR RAILWAY CARS.—Peter A. La France and J. D. Dinsmore, Elmira, N. Y.

First, We claim a portable head rest constructed with adjustable jaws, A A', supporting a curved head rest, C, said parts being respectively constructed and combined for use, substantially as set forth.

Second, We claim the semicircular head rest, C, when constructed with slots for receiving a stud, B, by which it is adjustably attached to the jaws, A A', substantially as set forth.

Third, We claim the pad, E, suspended upon elastic straps, E', when used in combination with a head rest, substantially in the manner and for the purpose set forth.

Fourth, A portable head rest for attachment to the backs or arms of the seats of railway cars, when so constructed that the jaws by which it is so attached shall form, the front piece an obtuse, and the hind one an acute angle, with the top face to which the head rest is attached, substantially as set forth.

57,927.—EXTENSION TABLE.—George Lanter and Jacob Kautz, Vincennes, Ind.

First, We claim the application of the halflegs, B B, to a longitudinally and laterally extensible frame of an extensible table, substantially as described.

Second, Connecting the outer ends of the sliding rail sections d d, together by means of jointed cross pieces, e e, substantially as described.

57,928.—DUMB WAITER.—R. Walcot Lawrence, New York City.

I claim the brake cord, S, applied in combination with the pulleys, T, on the adjustable cross bar, U, and the pulley, R, on the shaft, Q, substantially as described for the purpose specified.

57,929.—WATER-GAGE FLOAT.—L. L. Lee, Milwaukee, Wis.

I claim a float hammer, hardened in the manner and for the purpose substantially as described.

57,930.—KNOB LATCH.—Robert Lee, Cincinnati, Ohio. Antedated Sept. 2, 1866.

I claim, First, The reversible latch, C D d d', detachable slide, E F f f', shiftable pin, G g g' g", and spring, H, or their equivalents, arranged and operating as set forth.

Second, combining with the above elements the auxiliary spring, H', and shallow depressions, g'" d" d'", for the purpose stated.

Third, In the described combination, the indexed and reversible pin, G a g g' g", and the cap, B, having the hole, b, and numerals, 1 2 3, or devices substantially equivalent.

57,931.—CAR COUPLING.—David Lippy, Mansfield, Ohio.

I claim a car coupling composed of a swinging or pendent draw pin, B or B', fitted in a draw head, A or A', in combination with fixed rods, G G, and a shaft extending down in front of the draw head and connected either with the draw pin or with a sliding ledge, I, in the draw head, and all arranged in such a manner that the link or shackle, C, may, when a car is thrown from the track, be liberated by the movement of the shaft acted upon by the rods, G G, substantially as shown and described.

57,932.—CONDENSER.—J. Fred Llewellyn, Louisville, Ky.

I claim a condensing apparatus for use by druggists and others in separating alcohol and other volatile liquids, constructed and operated substantially as above set forth.

57,933.—ELASTIC BULB SYRINGE.—Hamilton D. Lockwood, Charlestown, Mass.

I claim the combination of the neck, c, button, d, and flange, e, for securing the elastic bulb, or the tube, to the metal connector, substantially as set forth.

57,934.—GAGE FOR SCREW-CUTTING TOOLS.—Edward Lyman, New Haven, Ct.

I claim a gage combining within itself a guide for forming the cutter with guides for setting the cutter, substantially in the manner and for the purpose herein set forth.

57,935.—WELL TUBE.—Francis A. Mack, Niles, Mich.

I claim forming the induction openings of iron well tubes of oblique incisions, e e, formed by cutting from the inside of the tube, having protruding lips or edges, with alternating depressions to prevent the admission of sand or other solid particles within, substantially as set forth.

57,936.—METHOD OF RECEIVING AND DELIVERING MAIL BAGS ON RAILWAY CARS.—Peter N. Maine, Olmsted Falls, Ohio.

I claim, First, the adjustable hook, C, pivoted to the shank and spring, c', in combination with spring hook, L, the shaft, B, weighted arm, D, hook, F, and staple, I', as and for the purpose set forth.

Second, The shaft, B, in combination with the arm, O, frame, A, lever, G, and staple, I, arranged as and for the purpose set forth.

57,937.—TREE PROTECTOR.—D. P. Mathews, Winthrop, Mass.

I claim my improved tree protector, made as described, viz: of the tubes, A B, and the two conic frusta, B C, arranged and applied, with respect to each other, as specified.

57,938.—FLYERS FOR ROVING FRAMES.—Thomas Mayor, Pawtucket, R. I.

I claim forming upon the shoulder of the presser to a flyer an inclined plane, a, and combining the same with a stud pin, b, or other fixed stop in the side of the flyer, substantially as described for the purposes specified.

57,939.—GROUND DRAG.—B. J. McAfee, and J. H. Wirt, Delphi, Ind.

We claim the sides, A, in combination with the cross bars, B, when constructed and arranged, in relation to each other, in the manner and for the purpose set forth.

57,940.—APPARATUS FOR CARBURETING AIR.—H. M. McAvoy, Baltimore, Md.

I claim, First, The air-forcing wheel, B, and the attached cylindrical casing of perforated metal or frame, covered with fibrous or porous material, arranged and operating substantially as described.

Second, I claim one or more meter wheels, C, covered by permeable casing, C', revolving independently by the pressure of the gas from the forcing wheel, being separated from the chamber, B", by the partition, D, and connected therewith by pipe, E, substantially as described.

Third, I claim the feeding apparatus, H, operating as described, and connected to any part of the machine, in combination with the partitions, G G, and shelf or gutter, I, substantially as described.

Fourth, I claim the regulator chamber, J, and its inverted vessel, L, as described, in combination with the connecting pipes, K K F F and E' E".

Fifth, I claim the casing or box, M, arranged on the outside of the machine for containing the gearing, substantially as described.

Sixth, I claim the perforated metal or wire-gauze diaphragms in the air inlet, for the purpose described.

57,941.—GOVERNOR FOR HORSE-POWER.—Thomas B. McConaughey, Newark, Del.

I claim the governor herein described, the same consisting of the ball arms, F, hung on a common center pin, a, of the governor shaft, provided with arms, I, connected together with spring, J, in combination with swinging arms, L, of the fixed collar, K, of the governor shaft and loose collar, M, when combined and arranged together and connected with the governor shaft so as to operate substantially in the manner described and for the purpose specified.

57,942.—CHURN.—Wm. R. McCutcheon, Washington, Iowa.

I claim, First, The arrangement of the shafts and dashers herein set forth, whereby the one or the other dasher may be operated as required.

Second, The arrangement of the dasher, p, in the oblique position in relation to the dasher, o, as herein recited.

Third, The arrangement of the spaces or holes, v and w, in the dashers, as and for the purposes described.

57,943.—RAILROAD CHAIR.—B. McDevitt, Belvidere, Ill.

I claim the combination of the chair, made in two parts or sections, B and C, and the wedge, G, when constructed, combined, and arranged together substantially as and for the purpose described.

57,944.—HAMES TUG.—John McInnes, Waverly, Illinois.

I claim the combination of the metallic plates, C and D, also the link, E, with the tug, A, and trace, B, substantially as described.

57,945.—COTTON-TIE FASTENING.—Thomas McIntire, Portsmouth, Ohio.

I claim a new article of manufacture, viz: iron hoops for cotton bales, cut to the required length, and having a clasp or buckle, constructed substantially as described, permanently attached by a rivet at one end so as to form a hinged joint, the whole being covered by a protecting covering of paint or varnish, substantially as described.

57,946.—FARM GATE.—Horace D. Mead, Wayne, N. Y.

First, I claim the weights, G and G', when applied as and for the purpose specified.

Second, I claim the arrangement of the supports, F, when made and applied substantially as set forth.

57,947.—APPARATUS FOR PACKING STRAW INTO BOILERS.—Harrison B. Meech, Fort Edward, N. Y.

First, I claim the plunger, a, and shaft, G, in combination with the cylinder, E, and boiler, A, substantially as described.

Second, The cylinder, E, and diaphragm, d d, substantially as and for the purpose specified.

Third, The combination of the frame, o o and F, reciprocating bar, H H, shaft, G, cylinder, E, diaphragm, d d, with the boiler, A, substantially as and for the purpose specified.

57,948.—BATTLE VALVE.—Warren P. Miller, San Francisco, Cal.

I claim the valve, c, when made to operate in the case, b, by means of the weight, g, substantially as shown and described.

57,949.—AERIAL RAILROADS.—Richard Montgomery, New York City.

First, I claim the construction of an aerial railroad with two tracks, one above the other, substantially as described.

Second, The construction of the horizontal portion or cross-ties of an aerial railroad in the form of a double curve, substantially as shown in fig. 2, plate II., and in the manner herein described.

Third, The construction of an aerial railroad upon a single column, substantially as shown in fig. 3, plate II., and in the manner herein described.

57,950.—LADIES' DRESS ELEVATOR.—S. A. Moody, New York City.

I claim the arrangement of the key or toggle, b, affixed to the dress by a short cord, substantially as described, and a series of rings, c, for looping up the skirts of ladies' dresses, as and for the purposes herein described.

57,951.—SLED BRAKE.—H. L. Naramore, Cummington, Mass.

I claim the levers, L L, rods, J J, and elbow levers, I I, in combination with the brake bars, H H, and sled, A, substantially as and for the purposes described.

57,952.—CULTIVATOR PLOW.—W. D. Nichols, Chicago, Ill.

First, I claim connecting the mold boards or plows, A A, with a hinge joint, substantially as described.

Second, The slot, s, or its equivalent, in combination with the mold boards or plows, substantially as described.

57,953.—STEAM-ENGINE GOVERNOR.—William Nichols, Elmira, N. Y.

I claim the arrangement, substantially as described, of the balls, D, arms, D' cams, D", and weight, E, for the purpose set forth.

57,954.—EVAPORATOR.—Robert C. Nourse, Corydon, Ind.

First, I claim the stirrers, B, arranged in two rows, and applied to a common rod, C, connected by an arm to a crank shaft, substantially as and for the purpose set forth.

Second, The skimmers, F, operated from the crank shaft, E, in connection with the inclined planes, H, all arranged and applied to an evaporating pan, substantially as and for the purpose specified.

Third, The combination of the stirrers and skimmers, applied to an evaporating pan, to operate in the manner substantially as and for the purpose set forth.

57,955.—MACHINE FOR VARNISHING CLOTH.—Samuel B. B. Nowlan, New York City.

First, I claim the steam table, C, arranged underneath the cloth and in relation with the brush, D, substantially as herein set forth, for the purpose specified.

Second, The adjustable sliding frame, G, applied in combination with the vat, B, substantially as herein set forth for the purpose specified.

Third, The vat, B, pressure rollers, J n, and frame, G, arranged in relation with each other and with the steam table, C, and brush, D, substantially as herein set forth.

Fourth, The arrangement of the blower, E, and perforated serpentine pipe, F, with reference to the cloth as it passes from the coating or saturating devices, substantially as herein set forth for the purpose specified.

57,956.—WATERPROOF COMPOSITION.—Samuel B. B. Nowlan, New York City.

I claim a waterproof composition, made substantially in the manner herein described.

57,957.—VISE.—Charles Parker, Meriden, Ct.

I claim the wrought-metal bar, D, in combination with the cast metal jaw, C, when constructed and united substantially in the manner and for the purpose specified.

57,958.—MODE OF TREATING CANE JUICE.—John E. Pattison, Houma, La.

I claim the revolving cylinder, A, inclined on its axis, furnished with lifting buckets, d, and adapted to the passage of a body of gas, substantially as described.

I also claim, in combination therewith, the draught wheel, operating as described.

57,959.—SLED.—Francis Peabody, Vevay, Ind.

I claim, First, The eye bolts, J, or their mechanical equivalents, in combination with the raves, E F, transverse beams, G H, and cross bars, M N, all arranged and operating substantially as in described and specified.

Second, In combination with the eye bolts, J, and self-adjusting frame, E F G H M N, I claim the flexible diagonal braces, T T', for the purpose specified.

Third, In combination with the elements of the two preceding clauses, I also claim the double-ended runners, A a a B b b', as described and set forth.

57,960.—COMPOSITION FOR FILLING WOOD.—James Perry, Northampton (Leeds), Mass.

First, I claim the use of silicious marl, or infusorial earth, for the purpose of filling and polishing wood, substantially as herein set forth.

Second, The combination of silicious marl with any or all of the substances herein named: sulphate of zinc, muriate or ammonia, gum arabic, gum tragacanth, oil, substantially in the manner and for the purpose herein set forth.

57,961.—COMBINED HARROW AND MARKER.—Ameron Pierce, Olmsted, Ohio.

First, I claim the toothed roller, D, and smooth roller, C, combination with the frames, A A', as and for the purpose substantially set forth.

Second, The wheels, E E' and F, the arms, G, and curved ar

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H, as arranged, and in combination with the rollers, D and C, and the frame, A A', for the purpose and in the manner described.

57,932.—CAR COUPLING.—A. Pierce, Olmsted Falls, Ohio.

I claim the arrangement of the lever, C, sliding bolt, G, and spring, b, in combination with the sliding catch, c, springs, f', and bumper, E, arranged and operating as and for the purpose set forth.

57,933.—APPARATUS FOR DRYING PHOTOGRAPHS.—Alfred C. Platt, Oberlin, Ohio.

I claim a device for holding a print or picture in a curved or convex shape while drying, substantially as described.

57,964.—TABLE-STAND FOR FOOD.—Benjamin F. Porter, Manchester, N. H.

I claim the revolving table-stand consisting of the end plates, B B, rods, C C, gauze netting, d, shelves, F, pin, G, base, H, cross bar, I, posts, J, and catch, L, constructed and arranged in the manner and for the purpose herein specified.

Second, In combination with the above, I claim the sliding door, E, arranged and operating as herein described.

57,965.—SHEEP RACK AND SHED COMBINED.—D'Arcy Porter, Cleveland, Ohio.

I claim a sheep rack and fold, constructed substantially as and for the purpose as herein set forth.

57,966.—SCREW.—T. T. Prosser, Chicago, Ill.

I claim a screw having its threads of a convex form, with a concave form of the space between them, when combined with a tapering form from the commencement of the threads to the point.

The combination of a pyramidal front with the threads of a two or three-threaded screw, when the screws and intermediate spaces are constructed substantially as set forth.

57,967.—GATE.—Stephen Puffer, Oxford, N. Y.

First, I claim two or more stationary guide supports for guiding the gate from the friction roller, and sustaining its weight when opened, substantially in the manner and for the purpose herein set forth.

Second, I claim the large friction roller, C, having its axis on either of the rear posts of a gate, and smaller friction roller, c, when arranged and combined with stationary guide supports, D D', substantially in the manner and for the purpose herein set forth.

57,968.—PLOW.—Tillman Rams, Keokuk, Iowa.

I claim the share, A, provided with the socket, C, in combination with the bar secured to the landside, S, when constructed as and for the purposes and substantially as described.

57,969.—REDUCING METALLIC OXIDES AND REFINING THE METAL RESULTING THEREFROM.—Jacob Reese, Pittsburgh, Pa.

First, I claim the manufacture of iron or other metals from their ores in a furnace, in which the ore, having been fused with the aid of a blast of atmospheric air, is then reduced to its base with a hydrocarbon.

Second, The process of fusing iron ores and other metallic oxides by the aid of a blast of atmospheric air in a furnance, and the waste heat from the reducing chamber, without the use of other fuel, or with so little fuel as not to deoxidize the ore in melting, and running the melted ore immediately into a receptacle below the influence of the atmospheric blast, in which it is deoxidized by the injection of any hydrocarbon into the molten mass, in the manner substantially as hereinbefore described.

Third, The use of an atmospheric blast for fusing metallic oxides, in combination with the use of hydrogen or carbon, or a hydrocarbon, for the reduction of the melted oxide to its metallic base, substantially as hereinbefore described.

Fourth, The use of the compound of water, or steam, and oil in a liquid or vaporous condition, in the proportions hereinbefore described, as a new material for the refining of melted metal.

Fifth, Combining with a cupola, or melting furnace, one or more reducing chambers, placed, for the reception of the melted ore, below the point at which the atmospheric blast is introduced into the furnace for the purpose of running the melted ore directly from the furnace into a reducing chamber in which it may be deoxidized, carbonized and refined, away from the influence of the atmospheric blast, substantially as hereinbefore described.

Sixth, Connecting the reducing chamber or chambers to the bottom of the cupola, or melting furnace, by a hinge or pivot, so that they may be swung away from the furnace without impairing their connection with the vessel containing the reducing agent.

Seventh, The use of the hollow shaft, c, in combination with the reducing chamber, B, and connecting passage, i, for the purpose of hanging the reducer to the cupola, and allowing of the introduction into the reducing chamber of the liquid or gaseous agents for the reduction of metallic oxides.

Eighth, The combination of the water tank, E, with one or more tanks for holding the liquid, deoxidizing or carbureting agents, for the purpose of applying the pressure of live steam, or of a head of water, to forcing the deoxidizing agents into the reducing chamber, substantially as hereinbefore described.

Ninth, Constructing the tweer forming the communication between the interior of the reducing chamber and the cell below it, of fire clay or other refractory material, in combination with a tubular metallic screw stem projecting therefrom, substantially as and for the purpose hereinbefore set forth.

Tenth, The use of lime or oxide of calcium as a lining for reducers or furnaces, wherein ores or metals are decomposed or refined.

57,970.—MARINER'S COMPASS SCALE.—John Reid, Knoxville, Md.

I claim the combination of the compass and the scale, substantially as described.

I also claim, in combination with the above, the arrangement for setting compass to a given variation, for the purpose described.

I also claim in its combination with the compass and scale, the center pin, operating substantially as described.

57,971.—CASTER.—John M. Riley, Newark, N. J. Antedated September 2, 1866.

I claim making caster wheels by preparing the rim, the plate and the hub in separate pieces, and uniting them to each other under pressure, substantially as above set forth.

57,972.—SELF-ACTING WAGON BRAKE.—Thomas J. Rockey, McElhattan, Pa.

I claim the arrangement of the strap, h, chain g, rod, c, springs, b b, and locking devices, d e f, constructed and operating substantially as described and represented.

57,973.—WIND WHEEL.—G. A. Roland, Wasioja, Minn.

First, I claim the arrangement of devices for turning the sails, consisting of the governor, M, shaft, K, hollow shaft, E, loose head, F, pin, a, oblong slot, b, ring, x, and sails, B, all substantially as and for the purpose set forth.

Second, In combination with the foregoing, the windlass, j, and rope, p, substantially as and for the purpose set forth.

Third, In combination with the wind wheel, as herein described, the turn table, L, upon rollers, R, and having a flange, f, and dogs, d, substantially as and for the purpose set forth.

57,974.—METHOD OF SEPARATING SAND FROM WATER IN WELLS.—Timothy Rose, Cortlandville, N. Y.

I claim the combination of the inside tube with the strainer of wire cloth, or its equivalent, and the flange to cut off the inferior chamber, together with the movable point with the grooved stem, by which is secured open passage downward through the end of the main tube, substantially as herein described, and for the purpose set forth.

57,975.—WAGON BRAKE.—Daniel Sager, Albany, N. Y.

First, I claim the arrangement and combination of the pole, A, with the lever, F, and connections, g h, directly with the brake-bar in rear of the wheels, essentially as herein set forth.

Second, The construction, substantially as shown and described, of the pendent shoe, H, on the ends of the brake-bar, by reducing their top portions, and so that when the shoes are freely suspended, the upper extremities, S, of the lower or rubbing portions thereof will be on a level, or thereabout, with the centers of attachment of the shoes, essentially as and for the purpose herein specified.

57,976.—MACHINE FOR CUTTING BELT LACING.—Benjamin F. Sanborn, Boston, Mass.

I claim the arrangement of the bed plate, A, pressure bar, F, and standard, B, in combination with the vertical knives with inclined edges, K, substantially as described.

57,977.—CLOTHES PIN.—Rufus S. Sanborn, Ripon, Wis.

I claim the clothes pin constructed with an elastic band passing through apertures in the jaws and two or more times around them, and with a plate or plates inserted in the joint to prevent lateral motion, substantially as described.

57,978.—GUN LOCK.—F. Schenck, San Antonio, Texas.

I claim the spring dog, j, and slide, h, in combination with the hair trigger, B, and hammer, H, constructed and operating substantially as and for the purpose described.

And I also claim the yielding tooth, a, in the main trigger to form a point d'appui for the hair trigger mechanism, substantially as herein set forth.

57,979.—SORGHUM STRIPPER.—Daniel W. Shares, Hamden, Ct.

I claim the combination of jaws, B and C, constructed and arranged so as to operate substantially in the manner and for the purpose herein set forth.

57,980.—MACHINE FOR FORMING LOCK JOINTS IN SHEET METAL.—Jacob Shaw, Hinckley, Ohio. Antedated September 2, 1866.

I claim the vibrating beam, C, die plate, F, die, E, and wedge, W, constructed and operating in relation to each other, in the manner and for purposes substantially as herein specified.

I also claim the arms, B and D, in combination with the stirrup, L, adjusting gage, P, and loop, T, substantially as and for the purposes set forth.

57,981.—TELEGRAPHIC FIRE-ARM.—G. W. Shawk, S. C. Morley, Cleveland, Ohio, and S. D. Cuchman, New Lisbon, Ohio.

We claim the adjustable bell extension arm, H', adjustable post, K, cushion, K', in combination with lever, H, magnets and armatures, as and for the purpose set forth.

57,982.—METHOD OF REMOVING OBSTRUCTIONS FROM OIL WELLS.—W. C. Sherwood, Buffalo, N. Y.

I claim the method of loosening and removing or wholly destroying such obstructing tools, tubing, or other obstructions which may be lodged in artesian and other wells, by the application and use of sulphuric acid, and other equivalent acids, substantially as herein set forth.

57,983.—COMBINED SHEEP SHED AND RACK.—J. P. Sibley, Oberlin, Ohio.

I claim the combination of the shed, G I J, the hay crib, D, and grain trough, B, with each other, the said shed, crib, and trough being constructed and arranged substantially as herein described, and for the purposes set forth.

57,984.—TURNING LATHES.—William Simpson, Z. Oman and S. Foreman, Nottawa, Mich.

I claim the arrangement of the tappet rod, M, with tappets, O O', by contact with which the carriage is made to operate the clutch drum on the gig-back shaft, F, substantially as and for the purpose described.

57,985.—SHEEP RACK.—Err and Dwight Skeels, Springwater, N. Y.

We claim the construction of racks for feeding sheep with the sides made up of removable slats, g g, fitting in grooves, f f, of the timbers, c d, and retained in place by abutting and filling the space at the bottom, the whole operating in the manner and for the purpose specified.

We also claim the combination and arrangement of the grain troughs, o, and hinged arms, n, with the boards, k k, forming a central alley, in the manner and for the purpose herein set forth.

We also claim the special construction and arrangement of the portable sheep rack, as herein specified.

57,986.—LOCK FOR DOOR OF BAGGAGE CARS.—Thomas Slaight, Newark, N. J.

I claim the combination of the timbers, j, and slide, E, provided with pin, k, and the spring arm, F, operating with the shouldered arm, d, having the thumb piece, c, substantially as described for the purpose specified.

57,987.—AXLE BOX FOR WAGONS.—Alfred E. Smith, Bronxville, N. Y.

I claim the new manufacture of axle boxes for wagons and other vehicles by forming on their but-ends, a raised shoulder having a series of teeth cut therein to engage in the back end of the hub in contradistinction to the use of lugs to secure the boxes in the hub.

I also claim the making of the axle box perfectly cylindrical throughout the length of it, so that by boring the hub with a true center, the box will fit it without the necessity of cutting any grooves or channels in the hub for the purposes hereinbefore set forth.

57,988.—LANTERN.—W. P. Smith, Louisville, Ky.

First, I claim two convex top pieces, B B', constructed, arranged and operating as and for the purposes set forth.

Second, In combination with the top pieces, B B', I also claim the handle consisting of the parts, J J j j, when constructed and operating as and for the purpose herein explained.

Third, In combination with the elements of the first claim, I also claim the clasp, I, for preserving the shape of the lantern either in its opened or closed condition, as described.

Fourth, I claim a folding lantern having one side made of two distinct pieces, E E', connected together by the hinge piece, c, substantially as specified.

Fifth, I claim the shiftable candle holder, I, in combination with the rod, K K, when constructed, arranged and operating substantially as specified.

57,989.—COVERED TUB FOR BUTTER AND LARD.—S. E. Southland, Jamestown, N. Y.

First, I claim the combination of a transverse sliding key, F, with the cover, B, and binding bar, D, of a butter tub or other vessel, substantially as herein described and for the purposes set forth.

Second, The formation of a key seat, C, in the cover, B, and binding bar, D, for the reception of the key, substantially as described.

Third, The ears, E, constructed as herein described in combination with the tub, A, binding bar, D, and cover, B, substantially as and for the purpose set forth.

57,990.—PIE RIMMER.—Jno. Stephen and William Zeller, Womelsdorf, Pa.

We claim the within described rimmer as an article of manufacture, consisting of a handle provided at one end with a rotary cutter secured to an irregular or ornamental roller and corrugated wheel, E, and at the other end with a butter cutter or print, substantially as represented.

57,991.—PLOW.—A. W. Stoker, Petersburg, Ill.

First, I claim a plow having its beam, A, pivoted and adjusted upon the standard, a, as shown, and also having its rear end secured and adjusted upon the rod, b, in the manner herein set forth.

Second, In combination with the standard a, set in from the land-side as shown, I claim securing the handle, C, to the elbow iron or brace, n, when arranged as shown as described.

57,992.—SULKY PLOW.—Stephen Stout, Tremont, Ill.

I claim the attaching of the draught pole, K, to the plow beam, F, by means of the universal joint, I, and flexible strap, M, in combination with the mounted frame in which the plow beam is fitted, substantially as and for the purpose specified.

I also claim the button, I, applied to the bar, C, and in relation with the handle K, of the plow, substantially as and for the purpose set forth.

I further claim the brace rod, N, applied to the plow beam, F, and to the mounted frame, substantially as and for the purpose specified.

57,993.—STEAM-GENERATOR SAFETY VALVE.—Stephen Stucky, New Albany, Ind.

I claim the valve-box, A, provided with an inner box, F, valve, C, lever, D, with weight, E, inlet, B, and throat, G, the whole being constructed and arranged in the manner substantially as and for the purpose herein set forth.

57,994.—CORN PLANTER AND PLOW COMBINED.—Samuel M. Swartz, Millheim, Pa.

First, I claim the arrangement of the levers, M, and their rung, N, with the plow, and with the clasp, f, and shipper, h, so that when the plows are raised up the driving mechanism will be thrown out of gear, and when let down will put itself into gear, substantially as described.

I also claim the ribs, n, and openings, o, on and through the seed slides, so that the grains can stand edgewise between the ribs and drop edgewise through the holes, as described.

I also claim in connection with the ribbed seed slides, the spring fingers, m, for arranging the grains between the ribs.

57,995.—HORSE POWER.—J. B. Sweetland, Pontiac, Mich.

First, I claim the two shafts, E E, situated upon opposite sides of the wheel, D, and both provided with right threads or both with left threads, as and for the purpose specified.

Second, The shafts, F F, lying under the wheel, D, both in the same direction and turning in opposite directions, as and for the purpose set forth.

Third, Providing the rim of the wheel, D, with holes as shown, as and for the purpose specified.

Fourth, The arrangement of the shafts, E E, gear wheels, G H, and shafts, F F, with the wheel, D, as constructed, as and for the purpose set forth.

57,996.—MARINE BALLOON.—Chester W. Sykes, Suffield, Ct.

I claim a broad, flat balloon of tubular or sectional formation to be held before the wind similar to a kite, in combination with sails and guide substantially as before described.

57,997.—MALT-KILN FLOOR.—George Taylor, Camden, N. J.

First, I claim constructing the plates, A, of such length as to cover two or more spaces between the joists, B, and so arranging them as to make the plates of each row break joints with the plates of the adjoining rows, to give additional strength and stiffness to the floor, substantially as described.

Second, The combination of the clips, E, with the plates, A, and joists, B, by means of the wires, F, or their equivalent, substantially as and for the purpose set forth.

Third, Confining the flanges, a, of the plate, A, together by means of bolts, rivets, or pins, to give permanency to the plates, and stiffness to the floor, substantially as specified.

57,998.—BROOM HEAD.—J. Taylor and R. M. Lafferty, Three Rivers, Mich.

First, We claim the combination of the clamping springs, C C, and adjusting screws, c c, with the center bar, D, attached to the sheath, A, so that the ends of the screws are within the sheath, substantially as described.

Second, We claim a center bar, D, arranged with a central socket for holding the tapering end of the broom handle, substantially as described.

Third, We also claim the combination of the block, B, handle, C, passing through it, flexible sheath, A, and center bar, D, in which the handle rests, as described.

57,999.—COMPOSITION FOR ROOFING.—J. P. Thompson, Kirkville, Iowa.

I claim a composition of matter compounded and prepared substantially as and for the purposes set forth.

58,000.—MEAT MANGLER.—G. H. Tift, Morrisville, Vt.

I claim the construction of the movable block, K, with key, M, and staples, I, when arranged and combined with the rollers, C, spring, D, and set screw, G, to operate as herein described and for the purposes set forth.

58,001.—WAGON TOP.—Andrew R. Tully, New York City.

First, The springs, F, and their combination with the hinge, f, wagon frame, A, rear bow, E, and knobs, a, substantially as herein shown and described and for the purpose set forth.

Second, The manner of attaching the knobs, a, by riveting them to a metal strap concealed beneath the leather strap, If, substantially as shown and for the purpose specified.

58,002.—MACHINE FOR PURIFYING GAS.—William C. Turnbull, New York City.

I claim, First, The combination of the tank, D, pipe, C, and agitators, d and c', with the cylinder, A, perforated plates, a, and stirrers, a', for the purpose of purifying the gas, constructed and operating substantially in the manner described.

Second, The combination of the cylinder, A, with the pipe, H, boxes, I, and perforated shelves, I', for the purpose of drying the gas after its purification, substantially in the manner herein shown and described.

Third, The application of unslacked lime for the purpose of depriving the purified gas of all its hygrometrical moisture, thereby rendering the gas chemically dry, and increasing its illuminating power, substantially as herein described.

58,003.—FENCE.—William Tuttle, Jr., Dowagiac, Mich.

I claim providing the adjoining ends of a panel fence with a locking device, substantially as and for the purpose described.

58,004.—LAP JOINT FOR BELTING.—Henry Underwood, New York City.

I claim, First, The combination of the strip, C, with the thinner pieces, A B, of the belting, the ends of said pieces being overlapped and secured to each other, substantially as described for the purpose specified.

Second, The manner of lacing the overlapping ends to the overlapped part of the belting, substantially as herein described and for the purposes set forth.

58,005.—DISTILLING PETROLEUM AND OTHER LIQUIDS.—P. H. Vander Weyde, Philadelphia, Pa. Antedated Aug. 8, 1866.

First, I claim the production of a partial vacuum by suction produced in the still by a pump, either between it and the condenser or at the end of the tube intended for the escape of the non-condensable products, which vacuum may be filled by those non-condensable products, vapor, air, or steam, led to and admitted from the other end of the apparatus, provided with a safety valve.

Second, The peculiar arrangement of the fractional condenser and its collecting and separating boxes, producing at one single operation liquids of different degrees of volatility, as above described.

Third, A series of stop cocks at different places in the still and condenser, for the purpose of admitting a current of air or of conducting the escaping gases and vapors or steam over or through the liquid during the process of exhaustion.

58,006.—MECHANICAL TOY.—Henry S. Vrooman, Hoboken, N. J. Antedated Sept. 2, 1866.

First, I claim an automatic animal figure, having four movable legs operated by a coil spring, in combination with a wheel or wheels, C, substantially as shown, when such wheel or wheels are used, upon which to suspend and propel forward the body of such figure, so as to leave the legs free to be operated to imitate the running movements of a quadruped, as shown.

Second, I claim the use or employment of a wheel or wheels, upon which animal automatic figures are suspended and propelled forward, of an irregular or eccentrical form, so as to give a rising and falling movement to the head and shoulders of such animal moving figure at each stride or movement of the legs.

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58,007.—Clothes Pin.—W. G. Ward, Savona, N. Y.

I claim a clothes pin consisting of the parts, A B and C, all constructed, combined, and operating substantially as shown and described.

58,008.—Water Wheel.—John S. Warren, Port Chester, N. Y.

I claim the upper and lower inclined or conical plates, a a', of the wheel, with the buckets, b, scolloped at their inner edges, in combination with the scroll, A, all arranged substantially as and for the purpose specified.

58,009.—Condenser.—J. C. Wharton, Nashville, Tenn.

I claim an improved condenser, formed of a series of hollow disks, D, constructed and connected with each other, substantially as herein described and for the purpose set forth.

58,010.—Amalgamator.—James D. Whelpley and Jacob J. Storer, Boston, Mass.

We claim, First, An amalgamator or separator, consisting of a hollow revolving cylinder, C, partially closed at the ends by centrally pierced disks, B, and revolved at a rate sufficiently high to more than overcome the influence of terrestrial gravity on matters placed within it, substantially as described.

Second, The arrangement of the supply pipe, P, and discharge pipe, P', in connection with a revolving cylinder, C, carrying fluid, and a tank, T, to secure the supply and discharge of fluid or pulp, substantially as described and for the purpose stated.

58,011.—Machine for Cleaning and Brightening Particles of Precious Metals.—James D. Whelpley and Jacob J. Storer, Boston, Mass.

First, We claim brightening metallic particles in finely pulverized and desulphurized ores, when such brightening is effected on the principle of mutual attrition in a cylinder, A, alternately closed during the brightening process, and opened to set free the charge by means of valve, d, in the exhaust pipe, C, intending to claim for this end the principle of alternately closing and opening the cylinder, so as to do the work in a close cylinder, as well as the combination of cylinder, A, valve, d, and exhaust pipe, C, for the purpose and substantially as described.

Second, The combination with feed hopper, B, of a fine grating to prevent the passage of any but very fine dust into the cylinder, and the further combination with said feed hopper, and rendered necessary by the exclusion of any but very fine dust from the charge of the machine and the revolving brush, l, and its discharging pin, K, operating substantially as and for the purpose described.

58,012.—Roasting, Desulphurizing, and Smelting Ores.—James D. Whelpley and Jacob J. Storer, Boston, Mass.

We claim the introduction of finely powdered chemical reagents, floated on an air or steam blast into an atmosphere of heat containing coal in aerial or air-borne combustion, substantially as and for the purpose described.

58,013.—Fence.—J. Whiteside, Coesse, Ind.

I claim an improved portable field fence, constructed and arranged substantially as herein described and for the purpose set forth.

58,014.—Wagon Brake.—Thomas T. Weir, Gallatin, Mo.

First, I claim the combination with the neck yoke, K, tongue, J, forward bolster, F, and brake bar, P, of a rod, M, jointed in two places to accommodate it to the movements of the tongue and forward part of the running gear of the wagon, substantially as described and for the purpose set forth,

Second, The combination of the iron guide brace, T, with the brake bar, P, and with the rear axle, C, and bolster, E, substantially as described and for the purpose set forth.

Third, The combination of the lever, U and rack, W, with the brake rod, M, and with the tongue, J, substantially as described and for the purpose set forth.

58,015.—Hand Spinning Machine.—Dickson Wilson and Henry Fairbanks, Adams Co., Ill.

We claim the pedestal, D, with the uprights or standards, e e, the driving wheel, A, the cords, H H, the spindle, C, the wheel, B, the screws, f f, and the center screws or pivots, G, combined and arranged as above described, or substantially so, for the purposes therein set forth.

58,016.—Carriage Seat.—Luther J. Woodruff, Mohawk, N. Y.

I claim a carriage seat having metallic corner pieces, substantially as and for the purpose described.

58,017.—Steam Generator.—C. S. Bell (assignor to himself and Joseph K Marlay), Hillsboro', Ohio.

I claim the tubes, B B' B'', arranged in rows one above the other and over the fire chamber, A, as shown, in combination with the sections or pipes, C C' C'' and E E' E'', constructed arranged, and applied substantially in the manner as and for the purpose set forth.

58,018.—Bale Fastening.—T. B. Bunting (assignor to himself and R. L. Delisser), New York City.

I claim the rolled edges, c, of the slotted frame, substantially as described for the purpose specified.

58,019.—Water Elevator.—George B. Curtis, Walcott, N. Y., assignor to P. K. Bronson.

I claim, First, The arrangement in double-bucket water elevators, substantially as shown, of the single tilting lever, D, and its spring bolt, I, in combination with the sliding clutch, C, for the purposes set forth.

Second, The spiral spring, s, and its locking bolt, I, in combination with the tilting bar, D, substantially as and for the purpose herein shown and described.

58,020.—Material for Lubricating.—M. P. Ewing (assignor to H. B. Everest and George P. Ewing), Rochester, N. Y.

I claim, as a new manufacture, an oil produced as above described, when produced from crude petroleum by the evaporation therefrom of the lighter hydrocarbons, in vacuo, by the use of steam, or its equivalent, to prevent burning, substantially as herein set forth.

58,021.—Apparatus for Distilling Petroleum, etc.—M. P. Ewing and H. B. Everest (assignors to H. B. Everest and George P. Ewing) Rochester, N. Y.

We claim, First, The pipes, h h', overlaying each other as specified, and forming a compact body, when employed in combination with a vacuum still having a continuous feed, substantially as herein set forth.

Second, The perforated pipes, i i, for injecting steam into the body of oil, when combined with a vacuum still having a continuous feed, substantially as specified.

Third, The chamber, K, in combination with the retort, A, and neck or tube, C, for catching the overflow, as herein set forth.

Fourth, The pipe, l, and receptacle, H, provided with the cocks, m n o, or equivalent, when combined with the chamber, k, for discharging the overflow without impairing the vacuum, as specified.

Fifth, The combination of the inclosing water tank, I, with the jet condenser, B, substantially as and for the purpose herein set forth.

58,022.—Flute, etc.—Samuel C. Goodsall (assignor to himself and Bennet Hotchkiss), New Haven, Conn.

I claim the within described mechanical arrangement of the keys, substantially as and for the purpose specified.

58,023.—Hand Spinning Machine.—B. A. Grant (assignor to himself and J. B. Coate), Mount Pleasant, Iowa.

First, I claim the combination of the arm, T, upon the car, U, with the U lever, n m, and the spring catch, S', or its equivalent, arranged and operating as and for the purposes described.

Second, I claim in combination with the U lever, n m, the employment of the lever, p, and arm, V, arranged and operating as and for the purposes set forth:

Third, I claim the combination of the jaw, G, spring, b, arm, i, and catch, c d, or its equivalent, arranged and operating as and for the purposes shown and described.

Fourth, In combination with said jaw, G, spring, b, and catch, c d, I claim the arrangement of the pin, r, or its equivalent, as and for the purposes specified.

Fifth, I claim the arrangement of the spring, s and t, and arm, W, with the arm, T, of the car, B, operating as and for the purposes set forth.

58,024.—Loom.—John B. Kershaw (assignor to himself and James C. Dickson), Indianapolis, Ind.

I claim the combination and arrangement of the variable pattern cylinder, X, constructed as described, with the treadles, 6 6, jacks, 9 9, and springs, 10 10, the whole operating as and for the purpose set forth.

58,025.—File.—William T. Nicholson (assignor to the Nicholson File Company), Providence, R.I.

I claim, as a new article of manufacture, a round or curved surfaced file, the teeth of which are severally distinct, as when cut by hand, but the rows of which are arranged in wave lines, substantially as described.

58,026.—Reaping and Mowing Machine.—George S. Reynolds, Tunbridge, Vt., assignor to himself and Francis A. Cushman, Lebanon, N. H.

First, I claim constructing the finger bar, A, of taper form in its transverse section, and with a lip, B, at its outer end, in combination with the track board or clearer, C, attached to the lip, B, by the pivot bolt, a, and provided with a pin or stop, b, substantially as and for the purpose set forth.

Second, The securing of the pitman or connecting rod, F, to the sickle, E, by means of the eye, g, at the outer end of F, and a slide, j, attached, and a pin, h, projecting eccentrically from a rounded portion of a rib, i, on the sickle, substantially as herein shown and described.

Third, Connecting the finger bar, A, to the main frame, H, by means of the bars, I I, and rod, J, constructed, arranged, and applied substantially in the manner set forth.

Fourth, The taper driving shaft, K, in combination with the taper or conical bearing tube, L, substantially as and for the purpose specified.

58,027.—Roller for Wringers.—Hiram Robbins (assignor to himself and Thomas H. Foulds), Cincinnati, Ohio.

I claim the elastic roll, B, of rubber, vulcanized upon the longitudinally flanged or ribbed and perforated shaft, A a d, substantially as set forth.

58,028.—Machine for Cutting Rubber into Threads.—D. W. Rust and George Buzzee (assignors to the East Hampton Rubber Thread Company), East Hampton, Mass.

We claim covering a cylinder with "mixed" rubber or other equivalent material, as a foundation upon which to cut rubber threads, substantially in the manner and for the purposes herein specified.

58,029.—Window-shade Fastening.—Elbridge J. Steele (assignor to himself and A. E. Taylor), New Britain, Conn.

I claim, First, The constructing of a window-shade fastening, with a bed plate, a, in the underside of which is a recess for receiving the cord, g, between it and the window casing, a hole, s, for the cord to pass through over the shoulder, f, with a crease or corrugation in it to prevent slipping, combined with the spring lever clamp, b, substantially as and for the purpose herein described.

Second, I also claim the lever clamp, b, with a recess in it for receiving the cord under the lower limb, in combination with the spiral spring, d, and the bed plate, a, constructed and operated substantially as and for the purposes herein specified.

58,030.—Carriage Wheel.—Richard Walker (assignor to himself and Peter Broadbrooks), Batavia, N. Y.

I claim, First, The combination of the ferrule, E, sleeve, G, nut, H, screw, F, and band, I, with each other, and with the spokes, B, and fellies, C, substantially as described and for the purpose set forth.

Second, The combination of the wedge or wedge-shaped nut, J, with the fellies, C, cap or band, I, and screw, F, substantially as described and for the purpose set forth.

58,031.—Tempering Springs.—P. Whysall and J. Porritt, Port Jervis, N. Y., assignors to themselves and M. M. Livingston, Brooklyn, N. Y.

We claim, First, The process of tempering springs, wire, etc., substantially as herein described.

Second, For the purpose of hardening, cooling, and tempering springs, wire, etc., we claim a bath composed of the chemical agents herein specified.

Third, In carrying out our process, we claim the employment of a vat, A, having a water chamber, B, all around it, and pipes, a b, letting into said chamber, whereby a constant current of cold water may be kept up for cooling the liquid in the vat, A, as herein shown and described.

58,032.—Musical Instrument.—George Woods (assignor to Henry Mason, Emmons Hamlin, Lowell Mason, Jr., and D. J. Mason), Cambridge, Mass.

I claim, First, The slide valve, E, with openings so arranged as to allow communication between the exhaust chamber or pump or bellows of a musical instrument, and one or more of the bellows or pneumatic stop levers, G, when the valve is moved to a proper position, substantially as described.

Second, I also claim the combination of the pipe, F, perforated on its bottom, with the air passage, J, leading to the exhaust chamber, C, and the passage, K, of the pneumatic stop levers, G, substantially as shown.

58,033.—Soda Fountain.—E. B. Wright, Cincinnati, Ohio, assignor to E. D. Finch and William H. Russell, Kokomo, Ind.

I claim the provision of the elevated reservoir, A, pipe, B, coil, B', refrigerating chamber, C, and fountain, D, combined and adapted to operate as set forth.

58,034.—Method of Curing Rheumatism.—Louis Fouilloux, Clermont Ferrand, France.

I claim the within described process of treating the part or parts of the body effected with oxygen gas and heated air, substantially as and for the purpose set forth.

58,035.—Seamless Pocket.—Gustav Kottgen, Barmen, Russia.

I claim a seamless pocket so woven with others that when separated its mouth will be made on the upper side, and adapted to be used for the purpose specified, substantially as described.

58,036.—Impregnating Substances with Preservative Material.—Emile Sabathe and Louis Jourdan, Paris, France.

We claim preserving vegetable or animal substances, whether in a raw or manufactured state, by means of a soap, as herein described, having a metallic base, insoluble in water but soluble in volatile liquids, or by heat or distillation, and applied in such soluble condition to the article or thing to be preserved by it, substantially as herein set forth and explained.

58,037.—Coating Iron and Steel with Gold, Silver, etc.—Jacob B. Thompson, Middlesex County, England. Patented in England Oct. 7, 1865.

I claim the process hereinbefore described of coating an article of iron or steel with a precious metal by first coating the article with pure iron and then with the precious metal, substantially as set forth.

58,038.—Steam Generator.—William Louis Winans and Thomas Winans, London, England. Patented in England June 23, 1866.

We claim the combination and arrangement of the valves, g, valves, g*, sector pieces, h, ring, i, tangent screw, j, block, k, bevel wheel, l, the circular tubes, f, dome, d, space, a, tubes, b, whereby the heated vapors may circulate among the tubes, f, or pass through the space, c, surrounding the dome, as may be desired, substantially as described for the purpose specified.

58,039.—Steam-engine Valve.—William S. Cooper, Philadelphia, Pa.

I claim the guiding rim, m, applied to the chest and spindle of a stop valve, substantially in the manner described.

REISSUES.

2,353.—Horse Rake.—Samuel L. Denney, Christiana, Pa. Patented Aug. 4, 1863. Antedated April 2, 1863.

I claim, First, The bar, c, connecting the ends of the thills, A, which are suspended from the axle, F, in combination with the clearing fingers, E, all arranged and operating in the manner described.

Second, The cast hollow casing, A', in combination with the arms, a and b', as and for the purpose set forth.

Third, The guard, g, constructed and used in the manner described.

Fourth, The guard, g, in combination with the tang, t', as and for the purpose set forth.

Fifth, The serrated rim, P, or equivalent, secured to the spokes or hub of the rake wheel, in combination with the arm, a, attached to the rake axle or spindle, the arm, b', the rod, I, the lever, R, the spring, X, and the curved standard, Y, all arranged in the manner described.

2,354.—Harvester.—James S. Marsh, Lewisburg, Pa. Patented Feb. 10, 1863.

I claim, First, The combined raking and reeling apparatus, which rotates around a vertical shaft, when its arms adjust themselves successively from a horizontal to a vertical position, and when the combined apparatus is so located that its arms swing on hinges which are below the highest point of the drive wheel, and the extent of the sweep of any one of the arms does not interfere with the driver seated on any part of the draft frame, which is outside of the drive wheel, substantially as described.

Second, The construction and adaptation of a combined rake and reel which revolves entirely around a vertical center, so that it may be applied to the harvester at a point which is on the inside of the drive wheel, and below the highest point of said wheel, substantially as described.

Third, Locating the hinges of the respective arms of the combined rake and reel around a center which is on the inner side of the drive wheel, and below the top of said wheel, substantially as described.

Fourth, Attaching each of the respective arms of the combined rake and reel to a hinge or pivot, which is on the inner side of the drive wheel, and below the top of the same, substantially as described.

Fifth, The adaptation of a raking and reeling apparatus combined, which revolves entirely around a vertical center, for application to the inner side of the draft frame of a harvester, at a point below the top of the drive wheel, substantially as described.

Sixth, The construction of the cam, R, of the combined rake and reel, in the manner described and shown.

Seventh, The construction of the crown wheel with boxes for a series of rake and reel arms, in the manner described and shown.

Eighth, The linking devices described, or their equivalents, applied to the arms of the raking apparatus, substantially as described.

Ninth, The use of the inner bearing of the drive wheel as the support of the center, on which the combined rake and reel revolve, substantially as described.

Tenth, The construction of the shaft or center, P, of the rake and reel bars, and the inner segment of the drive wheel, in one piece, in the manner described.

Eleventh, The combination of the cam, R, hinged rake and reel bars, and adjustable links, so as to keep the rake and reel bars firmly in contact with the grain in the field and on the platform, substantially as set forth.

Twelth, The arrangement of the sliding and turning spring pin, p, incline, p2, loose bevel pin, Q, and the raking and reeling apparatus, substantially as described.

Thirteenth, The adjustable grain guard, K, constructed substantially as described, and applied to the inner front corner of the draft frame.

Fourteenth, The combination of a draft frame, platform, driver's seat, device for adjusting the cutting apparatus, and a continuously revolving rake and reel combined, substantially as and for the purposes set forth.

Fifteenth, The combination of the device, T, on the outer divider, and a combined continuously revolving rake and reel, substantially as described.

Sixteenth, So constructing a harvester and a raking and reeling apparatus combined, that a driver can ride on the machine, and from his seat adjust both the rake and reel, and cutting apparatus and platform without stopping the machine, substantially as described.

Seventeenth, So arranging a revolving raking and reeling device, having two or more arms, including the rake as one arm, that the driver can sit on the machine and driver the team, the shaft of the rake and reel being at or nearly at right angles with the grain platform, and the arms of rake and reel not sweeping over the frame on which the driver is located so as to interfere with the driver on his seat, substantially as described.

Eighteenth, The combination of a central shaft, a revolving hub or crown wheel, a cam, and a hinged rake and reel arms, which are bent or curved near their hinging ends, as described, whereby the rake and reel arms, although hinged in rear of the cutting apparatus, are capable of reeling in and raking off grain at the inner front corner of the platform, as well as at the outer front corner thereof, and whereby, also, these arms are caused to incline over toward the grain side of the platform when they rise to their greatest altitude, substantially as described.

2,355.—Process of Bronzing or Coloring Iron.—Hiram Tucker, Newton, Mass., assignor to the Tucker Manufacturing Company, Boston, Mass. Patented Dec. 15, 1863. (Div. 1.)

I claim the process of ornamenting iron, in imitation of bronze, by the application of oil and heat, substantially as described.

2,356.—Manufacture from Iron in Imitation of Bronze.—Hiram Tucker, Newton, Mass., assignor to the Tucker Manufacturing Company, Boston, Mass.

I claim the new manufacture, hereinabove described, consisting of iron ornamented in imitation of bronze by the application of oil and heat, substantially as described.

Patent Claims.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as a fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

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Notes and Queries

G. W. C., of Ind.—The refuse spelter produced in galvanizing iron we believe is not refined for use in galvanizing. but is worked up for the poorer quality of brass or other alloy, . . . We know of no cheap substitute for the salammoniac of the flux.

W. H. M., of Ill.—In a system of pulleys where the weight is attached to a movable pulley, no part of the rope of the system sustains more than half of the weight.

H. B., of Ill.—Carbolic acid is obtained from the coal tar of gas works by treating the tar or that part of the distillate from it which boils at 350 deg. to 400 deg. with a strong solution of caustic soda, from which latter it is eliminated by hydrochloric or sulphuric acid. The quantity contained in the tar varies considerably; one per cent is probably near the average.

J. W., of Ill.—Without a description of the particular form of the Blanchard lathe you use, we could not offer an opinion as to the cause of its defective operation in turning ax handles. Your best remedy, it seems to us, would be to apply to the makers of the machine.

C. W. D., of Ohio.—Soapstone and sulphuric acid will not produce water that you or any living organism could drink with impunity. Your experimennt with nitric and sulphuric acid mixed with turpentine was an exceedingly dangerous one. Better not repeat it.

N. F. P., of N. Y.—Your plan of wheels of different diameters for rounding curves is not new, and practically the principle is employed on every street and other railroad.

S. H. H., of N. Y.—A mold made of four parts plaster Paris and two of fine brick dust, mixed with water in which a very little gum arabic has been dissolved, and made of the consistence of cream, will answer the purpose for lead casting admirably. Heat the mold gradually before a fire until well baked, and your mold will turn out a smooth casting.

J. H. P., of N. J.—We do not care to express an opinion upon the advantages or disadvantages of "shampooing." It is merely, and only, a cleaning of the scalp, and is as requisite for that portion of the head, or face covered by the beard as that covered by the hair. We use the shampooing process as a luxury, but the head and beard can be as effectually cleansed by means of pounded or pulverized borax in warm water, succeeded by soap and water, as by any patent preparation or the manipulations of a barber. The barber, if he does his duty, will give you better satisfaction than those "of your own household." Employ him.

S. W. C., of N. H.—The annoyance of the hiccough can be stopped so easily that everybody should know how it is done. It is occasioned by the convulsive and involuntary action of the diaphragm, which lifts the stomach, as in vomiting and sea-sickness, which action is occasioned or possible only when the stomach is empty. The remedy is simple and infallible. Drink water or any other beverage slowly, with continual swallowing, so long as you can hold your breath. If you do not breathe in the process you "tide over" the convulsion, and your hiccough is gone.

THE MARKETS.

The fall trade is fairly inaugurated and business is quite active. Gold quotations remain steady and the money market easy, but with a general predilection for short time paper. The prices of breadstuffs have somewhat advanced, which can be attributed mainly to causes temporary in their character. The influx of gold from Europe and the demand for our government securities abroad will tend gradually to reduce prices, although any sudden depression in commercial values is hardly to be anticipated. On the whole, the aspect of business generally is encouraging.

ASHES—Pots are quite dull, but with continued light receipts, market steady. Pearls are nominal.

BRICKS—Common Hard, $10 50@$11 50. Croton and Philadelphia are unchanged at $14@$15 for the former, and $40 for the latter.

COFFEE—Slight advances for lower grades of Rio.

COPPER—Detroit, 31@31½; Portage Lake, 31.

COTTON—Prices advanced ½@1⅛ ct. for Middling grades.

FLOUR.—Prices have materially advanced. Common brands rule from $8 90@$11 10; Ohio fancy brands $11 15@$11 20; Gennessee extra, $11 60@$13 50.

GRAIN—Wheat advanced slightly. Milwaukee, $2 25@$2 37 Amber, $2 75; North Carolina Red, $2 86. Rye, Western, 81c; Corn, no decided change. Oats, 44@48, Chicago; 47@50 Milwaukee.

IRON—Market dull. No. 1 American pig $48@$50. Scotch, $47 @$50.

LATHS—Are firm, with sales of Eastern at $4, three months.

LEAD—Pig is steady, with a fair demand; sales about 400 tons ordinary Foreign at 6¾@7 cents, gold. Bar is steady at $10 50, and Sheet and Pipe $10 70@100 m, net cash.

LEATHER—The market for Hemlock Sole continues dull, and prices are very firm. We quote Rio Grande and Buenos Ayres Light Weights, 33@34 cents; Middle do., 35@36; Heavy do., 36@37; California Light, 31@32; Middle do., 33½@34½; Heavy do., 34@35; Orinoco, etc., Light, 31@32; Middle do., 33@34; Heavy do., 29@32; Slaughter Upper in Rough, 31@33. Oak Sole is in light stock, and the market is firm. French and American Calf Skins are firm with a fair demand.

LIME—The market for Rockland is steady, with sales of 4,450 bbls., at $1 60 for Common, and $2 10 for Lump, cash. Glen's Falls is firm at $1 60 for Lump, and $2 25 for "Jointa," cash. Rosendala Cement, $1 75, cash.

LUMBER.—The market for Eastern Spruce and Pine is moderately active, with sales of 545,000 feet Spruce at $21@a$22 50, usual terms.

MOLASSES.—We have still to notice a dull and weak market, ut the decline cannot be said to have made any further progress. The sales are 474 hhds. and 95 tcs., tart Clayed Cuba at 44 cents; 155 hhds. Cuba Muscovado, 45@46; 100 hhds. and 25 bbls. Porto Rico, 60@75; and 46 hhds. inferior do., 51, 4 mos.

NAILS—Cut are very firm and scarce, with a tendency to advance; some sizes are scarce, and for these ¼ cent more is paid. We quote: Cut, 6¾@7 cents; Clinch, 8½; Forged Horse, $2.

SUGAR.—Quotations slightly reduced. Fair 10½@10⅝ cts; Good 10⅝@10¾. Refined 16½ for best Crushed, Granulated and Ground, 15½ for White A, and 15 for Yellow C.

WIRE—Telegraph, 9c.@10c. for Nos. 7 and 11, and for hoop skirt, 55c. for No. 18 covered, and 35c. for uncovered.

WOOL—Market unsettled. Western Fleeces at 48@50c. for low grades, 55 for ordinary, and 65@72½ for choice—the latter price for Ohio picklock; super and extra pulled, 53@65; short staple at 35; Texas, 15@18 for inferior, 20@24 for ordinary, and 25@30 for superior.

ZINC—9½c. less 4 per cent. for gold; 13½c., currency, for Lehigh.

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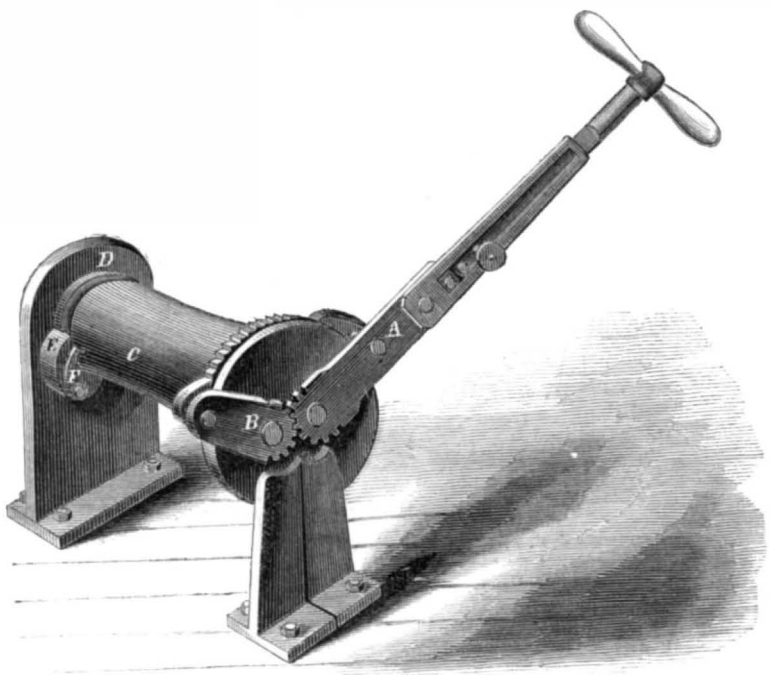
Improved Ship Windlass.

The engraving represents a device for producing a continuous rotary movement of a ship's windlass, with an attachment for separating the coil of the cable to prevent fouling, and a gripe for retaining the chain at any point. The combination appears to be very efficient for each of these purposes.

The lever, A, is provided with a geared segment that meshes with the corresponding geared arm, B. The pawl, on A, has a counterbalance which keeps the point in an inverted position, so that it works with the downward stroke of the lever, while that on the arm, B, engages the ratchet at the upward stroke. It will be seen that both pawls are moved at each stroke, producing a continuous rotary motion. The barrel, C, has a groove, and fitting into it, and secured to the housing, D, is a leader, E, which lays the first coil of the chain or rope, and separates it from the next. This separator is wedge-shaped, large at the top and receding to a thin blade where the cable first engages the barrel. The second and each succeeding coil is, by this means, receded and guided from the first. A check pawl, F, engages in the links of the cable and prevents slipping and the surging and straining frequently so injurious to the windlass and fatiguing to the men.



McGILL'S SHIP WINDLASS AND COIL SEPARATOR.

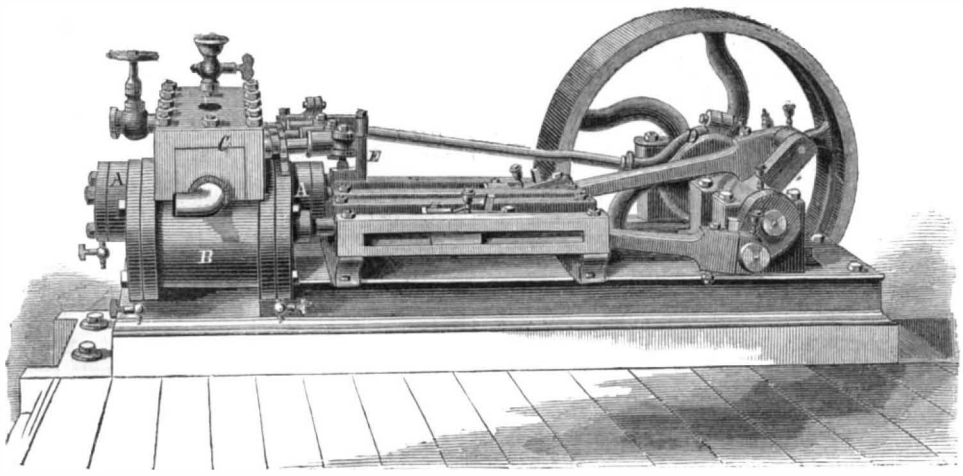
This combination can be arranged to work vertically as well as horizontally, and a combination windlass can be constructed which will work two or more barrels and revolve them in either direction. It is also self-locking at any point, and can be applied to raising any heavy weight.

It is the subject of two patents, bearing the dates of March 14, 1865, and April 18, 1865, issued to W. C. McGill, 277 Walnut street, Cincinnati, Ohio, who will sell rights to use or manufacture for a small bonus on each machine made.

Improved Combined Steam Engine.

It is well known that the steam, as it escapes from the cylinder of a high-pressure steam engine, has not parted with all its power-making force. A number of attempts have been made to utilize this power. It has been attempted to employ two cylinders, using two pistons affixed to one rod. Two cylinders have also been used, the waste steam from one working the piston of the other in only one direction. An attempt has been made to run two cylinders of the same capacity connected to cranks at right angles to one another. We believe none of these have proved to be marked successes, or they have not entirely fulfilled the expectations of their projectors.

The engraving represents an engine differing from either of these. The inventor says:—"It is a well known fact to all conversant with the operation of high-pressure, or non-condensing engines, that the steam, after having performed the work of forcing the piston the length of its stroke, is set free into the atmosphere at a much higher pressure than the atmospheric pressure of 14·7 lbs. per square inch, even when using steam expansively. For instance, a very common point of 'cutting off' is at 'half-stroke,' by which is meant closing the communication between the boiler and the steam piston when the latter has traversed one-half the length of the cylinder, and making use of this half cylinder full of steam, by its expansive force, to perform the remaining half of the stroke. Supposing, in these cases, the boiler pressure to be 80 lbs. per square inch above the atmosphere, as indicated by the steam gage, and the valve to cut off steam at half stroke, the pressure of steam in the cylinder, when the piston is at the end of its stroke, at about which time the egress to the atmosphere is opened, would be about 40 lbs. We have, then, a cylinder full of steam, having an elastic force of 40 lbs. per square inch, above the atmospherical pressure, discharged from the cylinder and lost, and representing an expenditure of fuel necessary to generate the excess of steam and that necessary to overcome the atmospheric resistance."



HUNTOON'S COMBINED STEAM ENGINE.

In the engraving, A is the main cylinder, and B the expanding cylinder, connected by a common steam chest, C. The main cylinder takes steam directly from the boiler at its full pressure, and is twice the length of the auxiliary cylinder, B. A works the steam expansively, but, instead of discharging into the atmosphere, exhausts into the cylinder, B, which has twice the diameter of A, but only half its length. The pistons of the two cylinders are connected by means of the usual rods to their respective cranks, both of which are on the same line. Of course the crank of A is twice the length of that which determines the stroke of B. The eccentric, D, works a lever pivoted horizontally to a stud on the frame, E. To this lever the valve stems are attached in such a manner that the requisite throw is given the valves of each cylinder.

It will be readily seen that the steam from the long or main cylinder exhausts into the expansive cylinder, which has an increased area of piston, and a stroke decreased proportionate to the reduced pressure of steam.

This combination was patented May, 15, 1866, by Lafayette Huntoon, Milford, Mass., whom address for additional information.

Age of Stone in China.

M. Chevreul, in a communication addressed to the French Academy, brings together some curious facts relative to the age of stone in China. It seems that when Confucius was staying in the Kingdon of Tchen, a bird of prey fell dead before the King. Upon examination it was found to have been killed by an arrow armed with a hard, sharp stone. Confucius was called upon to explain this, and related the tradition that in the year 1122 (B. C.) such a weapon had been presented as a token of sovereignty by Ououang to the first King of Tchen. Search was made in the Royal Museum, and the weapon was discovered. "This proves," says M. Chevreul, "that even at that remote epoch iron weapons had already been introduced into China, and the Stone Age only lived in tradition!" M. Stanislas Julien has confirmed this opinion by several extracts from Chinese encyclopedias, which put the existence of a Stone Age in China beyond doubt.

UNDERGROUND traveling increases at a surprising rate in London. In the first six months of 1863 the number of passengers carried on the Metropolitan line was 4,823,437; in 1864 for the same period, it was 5,207,335; in 1865, it was 7,462,823, but in the first half of the present year it rose to 10,303,395 The revenue has correspondingly increased; in the first of the four periods it was £53,058; in the last it amounted to £102,947.

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